

WHY DANCE? THE EFFECTS OF A GROUP DANCE PERIOD ON SOCIAL ATTENDING, ON-TASK  
BEHAVIOR, AFFECT, STEREOTYPICAL BEHAVIOR, AND DISRUPTIVE BEHAVIOR  
OF CLIENTS OF AN AUTISM TREATMENT PROGRAM

Emerald E. Allen, B.A.

Thesis Prepared for the Degree of  
MASTER OF SCIENCE

UNIVERSITY OF NORTH TEXAS

May 2018

APPROVED:

Shahla Ala'i-Rosales, Major Professor  
Jesus Rosales-Ruiz, Committee Member  
April Becker, Committee Member  
Jesus Rosales-Ruiz, Chair of the Department of  
Behavior Analysis  
Linda Holloway, Interim Dean of the College of  
Health and Public Service  
Victor Prybutok, Dean of the Toulouse Graduate  
School

Allen, Emerald E. *Why Dance? The Effects of a Group Dance Period on Social Attending, On-Task Behavior, Affect, Stereotypical Behavior, and Disruptive Behavior of Clients of an Autism Treatment Program*. Master of Science (Behavior Analysis), May 2018, 64 pp., 1 table, 18 figures, references, 18 titles.

Dance is an enjoyable activity that children can engage in across the lifespan. Many children with autism have limited leisure activity, such as dance, and also have challenges in terms of overall health related to physical activity. Previous research suggests that there are both immediate and prolonged benefits of exercise. The purpose of the present study was to evaluate the effects of a group dance period on on-task behavior, social attending, affect, stereotypic behavior, and disruptive behavior of three girls diagnosed with autism. The experimenter employed a reversal to evaluate the effects of a "dance party" on a range of behaviors over time. During dance activities, staff and children danced as a group and were observed before and after the dance period. During baseline there was no dance party. While no differences were found across measures, the children did have high levels of favorable affect during the dance party. The results are discussed in the context of previous literature and directions for future studies.

Copyright 2018

By

Emerald E. Allen

## ACKNOWLEDGEMENTS

There have been many people whose encouragement and support have been an integral part of completing this work. First, I would like to thank all of my family for always pushing me to be better and supporting my dreams, even if they send me to other countries. Thank you to my advisor, Dr. Shahla Ala'i Rosales. Your constant support, guidance, and wisdom have helped me become not only a better behavior analyst, but also a better person. Thank you to Dr. Jesus Ruiz-Rosales and Dr. April Becker for your valuable feedback and time. To Aria Dean, your mentoring, guidance, and feedback mean the world to me and I will forever be grateful to have had the opportunity to work with you. To the team of people that helped execute my study, Aria Dean, Naureen Surti, Mo Chauhdry, Dalai Hines, Lindsey Lambert, Laura Perez-Arnold, Madeline Kop, Nicholas Borquez, and April Linden, from completing IOA, to discussing principles, to helping with a review of the literature, to providing feedback on my manuscript, you have all been so helpful in my goal of completing this project. The hours you have all spent helping me work towards this goal have not gone unnoticed. Finally, thank you to the staff and clients of the organization where this study took place. You all have helped me to learn and grow and all while having the time of my life.

## TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS .....	iii
LIST OF TABLES AND FIGURES .....	v
INTRODUCTION .....	1
METHOD .....	12
Participants .....	12
Setting and Materials .....	13
Design .....	16
Procedures .....	16
Baseline .....	16
Dance Party Condition .....	17
Measures .....	18
Interobserver Agreement .....	20
RESULTS .....	22
DISCUSSION .....	45
APPENDIX A. SETTING PICTURE .....	49
APPENDIX B. DATASHEET .....	51
APPENDIX C. OBSERVATION CODE .....	53
APPENDIX D. INFORMED CONSENT FORM .....	59
REFERENCES .....	63

## LIST OF TABLES AND FIGURES

Page

### Tables

Table 1. Literature Review Matrix .....	9
---	---

### Figures

Figure 1. Numbers of steps taken during each dance party by participant. ....	27
Figure 2. Behavior averages for each child across all observation settings. ....	28
Figure 3. Behavior averages for all participants by setting sequences (left to right across day)..	29
Figure 4. Behavior averages for each child across all observation settings. ....	30
Figure 5. Percentages of intervals with favorable, unfavorable, and neutral affect for Whitney by setting sequences.....	31
Figure 6. Percentage of intervals with social attending and on-task behavior for Whitney by setting sequences. ....	32
Figure 7. Percentage of intervals with stereotypic and disruptive behavior for Whitney by setting sequences. ....	33
Figure 8. Percentage of intervals with favorable, unfavorable, and neutral affect for Gracie by setting sequences. ....	34
Figure 9. Percentage of intervals with social attending and on-task behavior for Gracie by setting sequences. ....	35
Figure 10. Percentage of intervals with stereotypic and disruptive behavior for Gracie by setting sequences. ....	36
Figure 11. Percentage of intervals with favorable, unfavorable, and neutral affect for Tiff by setting sequences. ....	37
Figure 12. Percentage of intervals with social attending and on-task behavior for Tiff by setting sequences. ....	38
Figure 13. Percentage of intervals with stereotypic and disruptive behavior for Tiff by setting sequences. ....	39

Figure 14. Percentage of social attending for each child by setting sequences.....	40
Figure 15. Percentage of on-task behavior for each child by setting sequences. ....	41
Figure 16. Percentage of favorable affect for each child by setting sequences.....	42
Figure 17. Percentage of disruptive behavior for each child by setting sequences. ....	43
Figure 18. Percentage of stereotypic behavior for each child by setting sequences. ....	44

## INTRODUCTION

Dancing is a fun, enjoyable activity that can be done throughout the lifespan with a multitude of people across a variety of cultures (Thomas, 1995, p.2). For example, in Texas the dance team is an integral part of the “Friday Night Lights” experience. Dance is also an important aspect of celebrations and daily life across many cultures. There are also many opportunities to engage in dance with a group of people throughout the lifespan that range from school dances to Zumba®.

Children diagnosed with autism spectrum disorder (ASD) do not participate in group leisure activities such as dance as often as their typically developing peers (Solish, Perry, and Minnes, 2010). This may be due to restricted interests and deficits in social interactions: two key criteria needed to receive a diagnosis of ASD (American Psychiatric Association, 2013). Teaching a child with ASD to participate in group dance activities is of particular interest to practitioners and researchers as it may provide children with new leisure activities and social opportunities. Exercise in general has health benefits, and some research suggests that exercise has a relationship with a decrease in stereotypical and disruptive behaviors (Bachman and Fuqua, 1983; Celiberti et al., 1997; Morrison, Roscoe, and Atwell, 2011) and an increase in on-task behaviors (Luke, Vail, and Ayres, 2014; Neely, Rispoli, Gerow, and Ninci, 2015; Miramontez and Schwartz, 2016).

In 2010, Curtin, Anderson, Must, and Bandini reported that 30% of children with ASD are overweight in comparison to 24% of their peers without an ASD diagnosis. This is likely because of food selectivity, motor impairments, and restricted interests in activities that are typically sedentary (Egan, Dreyer, Odar, Beckwith, & Garrison, 2013). Fortunately, a relationship



has been found between exercise and an increase in overall fitness for children with a variety of disabilities. In 2005, Fragala-Pinkham, Haley, Rabin, and Kharasch evaluated in-clinic group and individual home strength and aerobic exercise programs for nine children with a variety of disabilities (e.g., cerebral palsy, asthma, and pervasive developmental disorder). They measured the children's energy expenditure (their active heart rate minus their resting heart rate divided by speed of walking), walking speed, strength, etc. before and after each type of exercise program. While greater effects were found after the group exercise program than after the home exercise program, overall the children were found to have an increase in strength, improvements in functional and gross motor activities, and overall fitness after both exercise programs.

Dancing also has leisure benefits. For example, Lagomarcino, Reid, Ivancic, and Faw (1984) taught five teens diagnosed with mental retardation to appropriately dance. Prior to intervention, it was observed that all participants were noticeably "deficient in dance skills when compared to the dance skills of non-institutional-based retarded persons" (Lagomarcino et al., 1984, p. 73). While many of the participants could dance, many of the dance moves were deemed inappropriate by the researchers. Each session consisted of the researcher observing the participant dancing and then using least-to-most prompting (verbal, model, instruction, feedback, physical) to teach the participant to dance more appropriately. Appropriate dancing was defined as arms and legs moving in a coordinated fashion within 18 inches of the body. Post intervention, all participants were able to dance appropriately, however this improvement maintained only for one participant. It is important to note that the researchers reported that

teaching the participants to dance more appropriately made it easier for staff to assist at facility dances, thereby facilitating greater participation in leisure activities.

In addition to exercise having health benefits for people with ASD, a relationship has also been found in some studies between exercise and a reduction in challenging behaviors (namely disruptive and stereotypic behaviors) and between exercise and an increase in on-task behaviors. Table 1 gives an overview of these studies. Generally, researchers had participants engage in an exercise (often jogging) before observing targeted behaviors. Most studies that were reviewed saw a decrease in stereotypic/disruptive behaviors or an increase in on-task behaviors.

For example, Bachman and Fuqua (1983) used an alternating treatments design to examine the effects of different levels of jogging on disruptive behavior by comparing low and high heart rate conditions to a no exercise condition for four students classified as “trainable mentally impaired.” Immediately after the jogging or no exercise period, the students were observed for 15 minutes during their typical classroom activities. During this observation period, data were collected using 15 second partial interval recording for the disruptive behaviors (defined individually for each student). This study found that the jogging conditions with the highest heart rate yielded the largest decrease in inappropriate behaviors across participants. However, the authors concluded that fatigue could account for the decrease in inappropriate behaviors since conditions with higher amounts of physical exertion corresponded with larger decreases in inappropriate behavior.

In 1997, Celiberti, Bobo, Kelly, Harris, and Handleman implemented a reversal design to compare the effects of walking or jogging on the stereotypic behaviors of a young male

diagnosed with ASD. Stereotypic behaviors were classified as physical stereotypic behavior (rubbing, clapping, waving, etc.) or visual self-stimulation (squinting, peripheral staring). Before data were collected on the stereotypic behaviors, the participant jogged until he or she reached an aerobic heart rate or walked for six minutes. Observations were then made for 40 minutes during which the participant engaged in typical classroom activities. This study found that there was an overall decrease in physical stereotypy after jogging, with the greatest decrease occurring during the first 10 minute. However, there was little difference in visual self-stimulation after jogging or walking. As in other studies, the decrease in physical stereotypy might have been due to fatigue or to the similar physical consequences of physical stereotypy and exercise, however the authors of this study did not provide reasoning for the difference.

Morrison, Roscoe, and Atwell (2011) compared self-injurious and stereotypical behaviors during exercise, leisure, and social interactions conditions for four people with developmental disabilities. First, the authors performed a functional analysis to determine that the behaviors of interest were not maintained by access to items, escape, or attention. The functional analysis was important because the authors were interested in behaviors that were automatically maintained. Second, a preference assessment was performed to ensure that preferred activities were available during leisure and exercise conditions so that the participants would engage. Third, data was collected on stereotypic and self-injurious behavior during the three conditions. During the third phase, the participant was alone in a room with no materials to engage with immediately before and after intervention to determine baseline and post-intervention levels of self-injurious and stereotypic behaviors. During the exercise and leisure conditions, the participant was prompted to engage with the targeted items every 10

seconds unless unprompted engagement occurred. When the participant engaged with the targeted items, praise was delivered every 10 seconds. During the social interaction condition, no materials were available and the interventionist delivered attention in the form of social praise or neutral statements every 10 seconds. This study found that exercise and access to leisure items reduced problem behaviors for all participants during the intervention period, it also found that there was a post-intervention decrease for targeted behaviors in three of the four participants. The social interactions condition showed a post-intervention decrease for one participant. The authors state that possible causes for the post-intervention decrease in problem behaviors might be that exercise serves “as an abolishing operation and that engagement with the exercise item may have produced stimulation that was functionally similar to that produced by problem behavior” (Morrison, Roscoe, Atwell, 2011, p.539). For example, running (while moving the arms back and forth, hands up and down) may produce similar stimulation as waving the hands up and down. It is also believed that “another operating mechanism that may account for the post-exercise decreases observed is fatigue” (Morrison, Roscoe, Atwell, 2011, p.539).

While some studies have found a relationship between exercise and a decrease in stereotypic and disruptive behaviors, exercise did not yield decreases in such behaviors for participants of some studies. For example, Celiberti, Bobo, Kelly, Harris, and Handleman (1997) found that jogging yielded decreases in physical stereotypy in a young male diagnosed with autism, however it had no effect on his visual self-stimulation. While the authors did not provide reasoning for the lack of effect on visual-stimulation, it may be because exercise has similar physical consequences as physical stereotypy but not with visual self-stimulation.

Similarly, Larson and Miltenberger (1992) found that 15 minutes of jogging did not reduce problem behaviors in six adults diagnosed with mental retardation. The authors were unable to conclude an exact reason for this lack of effect, however they did note that it could be because of individual variables (i.e., history with exercise) and/or contingencies in post-exercise environments (i.e., staff/setting variables).

Some studies have found a relationship between exercise and an increase in on-task behavior. Luke, Vail, and Ayres (2014) compared physical activity to low (sedentary) activity called “child directed centers” for the on-task behavior across five children with developmental delays using a reversal design. Each day, the children would engage in “child directed centers” for 15 minutes or a physical activity for 20 minutes before participating in a teacher lead activity. This study found that all participants had an increase in on-task behavior following the physical activity condition whereas after the “child directed center” condition, on-task behavior was comparable to baseline levels.

Likewise, Neely, Rispoli, Gerow, and Ninci (2015) evaluated academic engagement (defined individually) for two children with ASD using a multielement research design. They compared academic engagement after no exercise, exercise until “behavioral indicators of satiation” occurred, and a brief duration of exercise. During each exercise condition, the children would jump on a trampoline for a brief duration or until they indicated that they were done jumping three times (they labeled this a “behavioral indicator of satiation”). In each condition, the instructor would engage with the child in 10 minutes of discrete trials where academic engagement was evaluated. The results of this study indicated that academic engagement after the no exercise condition were consistent with baseline levels, academic

engagement increased slightly after the brief duration of exercise, and a large increase in academic engagement was shown after the exercise until “behavioral indicator of satiation” condition. The authors state that an increase in academic engagement in the “behavioral indicator of satiation” condition may be due to “fatigue, or the idea that antecedent exercise leads to subsequent decreased stereotypy due to the participants being tired from exercise” (Neely et al., 2015, p. 14) or “that antecedent exercise may function as an abolishing operation for the interfering stereotypy” (Neely et al., 2015, p. 14).

The only study that specifically addressed dancing and young children with autism was conducted by Miramontez and Schwartz (2016). They compared the effects of yoga and a dance party on the on-task behavior of three kindergarten students diagnosed with ASD utilizing an alternating treatment design (yoga and dance party), with story as the control condition. Each day the students participated in circle time, at the end of circle time the children either participated in yoga (5-7 poses), dance party (5 minutes), or listened to a story. Directly after the dance, yoga, or story, students engaged in a journal writing activity where on-task behavior was measured for seven minutes. In general, on-task behavior increased after activities that required movement while listening to a story produced results that were comparable to baseline levels. The authors stated that the increase in on-task behavior after yoga and dance party might have been “because vigorous physical activity serves as a more fulfilling sensory experience, allowing students to be available for learning following active vigorous engagement” (Miramontez & Schwartz, 2016, p.412-413).

In summary, some studies have found that there is a relationship between an increase in on-task behavior and exercise, while other studies have found that there is a relationship

between exercise and a decrease in stereotypical and disruptive behaviors. Most participants were male, as may be expected since there is a higher prevalence of autism spectrum disorder in males (4:1) (Werling & Geschwind, 2013). The authors speculate that the increases in on-task behavior or decreases in stereotypical and disruptive behaviors may have been due to fatigue, exercise possibly having the same physical consequences as stereotypical behaviors, and that exercise may set the occasion for less stereotypical and disruptive behaviors and more on-task behaviors.

The reviewed studies utilized a variety of measurement systems including partial interval recording, momentary time sampling, and whole interval recording. Observation times ranged from 5 to 15 minutes with 5 to 15 second observation intervals within the samples.

This study was a systematic replication of Miramontez and Schwartz (2016). The purpose of this study was to evaluate the effects of a group dance period on social attending, on-task behavior, disruptive and stereotypic behaviors, and indices of happiness displayed by children of an autism treatment program. The study sought to evaluate if any changes in these behaviors occurred before or after the dance period.

Table 1

## Literature Review Matrix

Citation	Participant Characteristic	Dependent Variable	Independent Variable	Results	Conceptualization
Bachman, J.E., & Fuqua, R.W. (1983). Management of inappropriate behaviors of trainable mentally impaired students using antecedent exercise. <i>Journal of Applied Behavior Analysis</i> , 16 (4), 477-484.	4 males, ages 6-16	Problem Behaviors (inappropriate vocalizations, off-task); Stereotypic Behaviors (repetitive movements); 15-second partial interval recording	"Moderate" and "Vigorous" Jogging Rates; No Exercise	Jogging conditions with the highest heart rate yielded the largest decrease in inappropriate behaviors across participants.	Fatigue could account for the decrease in inappropriate behaviors as conditions with higher amounts of physical exertion corresponded with larger decreases in inappropriate behavior.
Celiberti, D.A., Bobo, H.E., Kelly, K.S., Harris, S.L., & Handleman, J.S. (1997). The differential and temporal effects of antecedent exercise on the self-stimulatory behavior of a child with autism. <i>Research in Developmental Disabilities</i> , 18 (2), 139-150.	5y-9m male	Physical Stereotypy; Visual Self-Stimulation; 10-second partial interval recording	No Exercise; Walking; Jogging	Overall decrease in physical stereotypy during jogging condition, with greatest decrease being the first 10 minutes after jogging. Little difference in self-stimulation after walking or jogging.	Authors did not speak to reasoning for the difference, however it may have been due to fatigue or similar physical consequences between physical stereotypy and exercise.
Morrison, H., Roscoe, E.M., & Atwell, A. (2011). An evaluation of antecedent exercise on behavior maintained by automatic reinforcement using a three-component multiple schedule. <i>Journal of Applied Behavior Analysis</i> , 44 (3), 523-541. doi: 10.1901/jaba.2011.44-523	2 males, 2 females; ages 10-21	Hand Wringing; SIB; Motor Stereotypy; Momentary time sampling	Exercise Condition; Leisure Items Condition; Social Interactions Condition	Exercise and access to leisure items reduced problem behaviors for all participants. Also found a post-intervention decrease for targeted behaviors in three of the four participants. Social interactions produced a post-intervention decrease for one participant.	Fatigue; "Engagement with exercise item may have produced stimulation that was functionally similar to that produced by problem behavior" (539, 2011); Exercise may serve as an abolishing operation

(table continues)



Citation	Participant Characteristics	Dependent Variable	Independent Variable	Results	Conceptualization
Larson, J.L., & Miltenberger, R.G. (1992). The influence of antecedent exercise on problem behaviors in persons with mental retardation: A failure to replicate. <i>Journal of the Association for Persons with Severe Handicaps</i> , 17(1), 40-46.	6 individuals, ages 22-29	Inappropriate Behaviors, Fatigue behavior, Physical measures (heart rate); 15-second partial interval recording	Leisure games (to control for attention), Walk-jog condition	Moderate-to-high levels of inappropriate behaviors throughout all conditions. No discernable difference from baseline to leisure games to jogging.	No difference in inappropriate behaviors may be due to individual effects and contingencies in post-exercise environments.
Luke, S., Vail, C.O., & Ayres, K.M. (2014). Using antecedent physical activity to increase on-task behavior in young-children. <i>Exceptional Children</i> , 80(4), 489-503. doi: 10.1177/10014402914527241	5 males, ages 3-7	On-Task Behavior (defined for each participant as well as each activity); Momentary time sampling (15 second intervals)	Child Directed Centers; Physical Activities	All participants had an increase in on-task behavior following the physical activity condition whereas the child directed center condition yielded results that were comparable to baseline levels.	Authors did not speak to reasoning for increase in on-task behavior.
Neely, L., Rispoli, M., Gerow, S., & Ninci, J. (2015). Effects of antecedent exercise on academic engagement and stereotypy during instruction. <i>Behavior Modification</i> , 39(1), 98-116. doi: 10.1177/014544552891	female 8yo, male 7yo	Stereotypy; Academic Engagement; 10-second whole interval recording	No Exercise; Antecedent Exercise Until "Behavioral Indicator of Satiation"; Brief Duration Exercise (all exercise was jumping on a trampoline)	Academic engagement after the no exercise condition was consistent with baseline levels, academic engagement increased slightly after brief duration of exercise, and a large increase in academic engagement was shown after the exercise until "behavioral indicator of satiation" condition.	An increase in academic engagement during the "behavioral indicator of satiation" condition may be due to fatigue. Exercise may serve as an abolishing operation.

(table continues)

Citation	Participant Characteristic	Dependent Variable	Independent Variable	Results	Conceptualization
Miramontez, S.K.H., & Schwartz, I.S. (2016). The effects of physical activity on the on-task behavior of young children with autism spectrum disorders. <i>International Electronic Journal of Elementary Education</i> , 9 (2), 405-418.	4 male kindergarten students	On-Task Behavior during journal writing	Story Time; Yoga; Dance Party	On-task behavior increased after activities that required movement (yoga and dance), while listening to a story produced results that were comparable to baseline levels.	The increase in on-task behavior after yoga and dance party might have been "because vigorous physical activity serves as a more fulfilling sensory experience, allowing students to be available for learning following active vigorous engagement" (412-413, 2016).

## METHOD

### Participants

Twelve clients in a focused program of a non-profit treatment center for children with autism in North Dallas were enrolled in the classroom where this study took place. Of the twelve, three female children were selected for evaluation in this study. Evaluated participants were chosen based on the anticipation that they would remain enrolled for the duration of the study. At the time of this study, all participants were receiving seven hours of services per week and each child had been evaluated using the Vineland-II that assessed domains including communication, daily living, and socialization skills that were norm referenced across the lifespan (Sparrow, Cicchetti, & Balla, 2005).

Whitney is a 7-year, 7-month old female diagnosed with autism who communicated using three-to-five-word sentences. Prior to attending the non-profit treatment program each day, Whitney attended public school for a full school day in a self-contained classroom. Whitney received speech and occupational therapy each week at the non-profit treatment center. Whitney's targeted goals included functional communication training, asking for help, appropriate protests, transitions, shared control, instruction following, responding to social cues, turn taking, initiating, and responding. Staff reported that Whitney could follow most one-to-two step instructions. Whitney's most recent Vineland scores indicated that her communication, daily living, and socialization skills along with her overall adaptive behavior were all at low adaptive levels.

Gracie is an 8-year-old female diagnosed with autism and encephalopathy manifested by language disorder who communicated using sentences occasionally. Prior to arriving at the

center each day, Gracie attended public school for an entire school day in a self-contained classroom. Staff reported that Gracie could follow instructions from multiple instructors. Gracie's most recent Vineland scores indicated that her communication skills were at a low adaptive level, and her daily living skills and her socialization skills were at an adequate adaptive level, with her overall adaptive behavior composite standard scoring at an adequate adaptive level. Gracie's targeted goals included functional communication training, appropriate protests, asking for help, attending and instruction following during group activities, social referencing, peer play, social questions, and transitions.

Tiff is a 10-year, 4-month-old female diagnosed with autism that communicated using two-to-three word phrases. Prior to arriving at the center each day, Tiff attended school for a full day in a communications classroom. In addition to ABA services, Tiff received speech and occupational therapy at the non-profit center. Staff reported that Tiff could follow one-to-two step instructions from a variety of adults. Tiff's most recent Vineland scores indicated that her communication, daily living, and socialization skills were at low adaptive levels, with her overall adaptive behavior scoring at a low adaptive level. During the study, Tiff's targeted goals included a language sample, expressive language, attending during 1:1 lessons, and responding and initiating during peer interactions. Tiff discharged from the autism treatment program on the fourth day of the third return to baseline.

### Setting and Materials

This study was conducted at a non-profit treatment center in North Dallas. During the study, the participants engaged in activities in the multi-purpose room of the non-profit

treatment center (see Appendix A for a picture of multi-purpose room)). The room was equipped with two groupings of tables with chairs around them, as well as toys appropriate for a variety of age groups, large cabinets, a circle time area (shape rug and calendar), and a window. The activities included snack, dance party, social skills group, art, and game time. During snack, social skills group, and art time, the children were split between the two groups of tables. Game time was run either at one of the groupings of tables or at the circle time area depending on the game. Dance parties were run on the shape rug of the circle time area. Children were observed during the first five minutes of each activity.

Video samples were taken using an iPad mini© and a tripod equipped to hold an iPad©. The tripod was set up so that most, if not all, participants could be clearly seen on screen.

During the dance party, the interventionist played preselected songs on an iPhone 6® that was connected to a SoundBot® bluetooth speaker. Participants wore a Sportline Triple Function Calorie Counting Pedometer® to measure the amount of movement (number of steps taken) during the dance period.

Observations took place at the beginning of each day's activities. Each day the children arrived at the treatment center, unpacked their bags, and went to snack time. Snack time began at 3:45pm and ended at 4:00pm, and the observer collected a 5-minute video sample at 3:50pm. Expectations remained consistent during snack time across baseline and dance party conditions. For example, during snack time children are expected to sit and eat their snack, clean up when they are finished eating, and talk to their peers. After snack, children immediately went to their social skills group for about 15 minutes. Children were assigned to groups by Board Certified Behavior Analysts based on skill level and age. Social skills groupings,

as well as expectations, remained consistent across baseline and dance party. Both social skills groups were in the same room, however they had different activities. Social skills group activities varied each day and consisted of games that targeted skills appropriate to the children's social skills level. Individual breakout sessions followed social skills group. Breakout sessions were comprised of the child working directly with an instructor on goals specific to their individual treatment.

At 4:35pm, art time began, and the duration varied depending on the complexity of the project. Art time groups were comprised of the same groupings of children as social skills group. Art projects were consistent across groups, however targeted skills varied. For example, for one group, raising their hand to gain access to materials might have been targeted while in the other group, asking a peer for items necessary to complete the art time project might be targeted. Similar to snack and social skills groups, art time groups and expectations remained consistent across baseline and dance party. Following art time, children returned to their instructor for a second breakout session.

Game time began at 5:10pm and generally lasted about 10 minutes. During game time, all children were grouped together and played a mixture of gross motor (e.g., Freeze Dance), board (e.g., *Toilet Trouble*), and guessing (e.g., Pictionary) games.

Group times (social skills, art, and game) were led by instructors who had passed initial training. Instructors who were not leading the group time acted as shadows and prompted the children to participate in the activity as appropriate, assisted them when the lead was otherwise occupied, and provided reinforcement for appropriate and targeted behaviors.

## Design

The study employed a reversal design across three participants. Each condition lasted for a minimum of five school days with the requirement that each child be present for at least four of the five days. Baseline 1 was run for 32 school days to evaluate the child's trends over time and to account for changes in routines (such as the new school year beginning). Dance Party 1 was run for 8 school days to allow the researcher to create a procedure that ensured that every client was participating. Baselines 2 and 3 and Dance Party 2 and 3 were run for five school days and all participants were in attendance for at least four of the five days.

## Procedures

### *Baseline*

During baseline, sessions were run with snack time occurring upon arrival, social skills group beginning at 4:00, art time beginning at 4:35, and game time beginning at 5:10. In between group times, children worked with their instructors on individual programming. The interventionist took 5-minute video samples using the iPad® and tripod. During snack time, the video sample began at 3:50pm to ensure that the children had time to transition in to the treatment center, unpack their bags, and begin to eat snack. During social skills group, art time, and game time, video samples began when the lead instructor initiated the group time; this could consist of presenting a greeting (e.g., "Welcome to art time everyone!") or an instruction (e.g., "Everyone needs to raise their hand to get a piece of paper"). All video samples were collected for 5-minutes and all participants were recorded concurrently.

### *Dance Party Condition*

Dance party began at 4:00pm and lasted for at least 5 but no longer than 6-minutes. During dance party, the interventionist modeled a simple dance that consisted of movements such as jumping, waving the arms up and down, and stomping the feet that were set to upbeat, preselected music. All instructors were instructed to dance and follow the interventionist's model, however, children were not required to follow the exact model. The expectation was for children to move and dance along to the music; it was not of concern if they were doing the exact dance. Just as with Miramontez and Schwartz (2016), children were prompted by their individual instructor to engage in movement after 30 seconds of disengagement using least-to-most prompting. Least intrusive prompting consisted of a vocal prompt (e.g., "Whitney! Let's dance!") or a prompt to attend to and copy the model (e.g., "Tiff, dance like Ms. Emerald is dancing"). If the child was still disengaged from the activity, the instructor provided a more intrusive prompt; these prompts consisted of partial physical prompting such as tapping the child's elbow or touching their shoulders so that the child would engage in movement. If these prompts were unsuccessful, the instructor used full physical prompting by holding the child's hands and moving with them (e.g., holding their hands and spinning the child around, moving the arms back and forth so that both the child and instructor are dancing together, etc.). If at any point in time, the child stated that they did not want to attend the dance party or walked away, their request was honored and they went to one of the groupings of tables where they worked on targeted goals with their instructor or engaged in a neutral activity. Upon completion of dance party the children separated into their respective groups and social skills group time began.



During dance party condition, sessions included snack, dance party, social skills group, art time, game time, and breakout sessions. Just as in baseline, snack began upon arrival to the center with video samples beginning at 3:50. However, at 3:58 the interventionist provided the group instruction to clean up and congregate on the shape rug of the multi-purpose room.

Social skills group time, art time, and game time were run similarly to baseline except that social skills group started five minutes later due to dance party. Just as in baseline, five-minute video samples were collected starting at the beginning of group times and all participants were recorded concurrently.

### Measures

The five dependent variables that were measured for the purposes of this study were social attending, on-task behavior, affect (favorable, neutral, and unfavorable), stereotypical behavior, and disruptive behavior. For full definitions with examples and non-examples, see Appendix D. Data were collected using five-second partial interval recording.

Social attending was defined as the child orienting towards an instructor/another child and looking at, making eye contact with, gesturing towards, or interacting with the instructor/another child all with a favorable or neutral affect.

On-task behavior was defined as the child orienting towards the instructor or instructional materials, being positioned in a way that is amenable to learning (e.g., sitting quietly with hands in lap, sitting on the floor with legs crossed), being engaged with the materials or instructor, and responding to questions/directions as they are presented (adapted

from Luke, Vail, Ayres (2014), Neely, Rispoli, Gerow, & Ninci (2014), Miramontez & Schwartz (2016)).

Affect was scored as favorable, unfavorable, or neutral. Favorable affect was defined as the child “[emitting] a vocalization or [assuming] a facial expression indicating pleasure, favor, or amusement. This [was] sometimes characterized by an upturning of the corners of the mouth. The child or [instructor emitted] a vocalization such as a laugh, giggle, or high—pitched shriek indicating pleasure, favor, or excitement. The laugh [could be] 1 second or more. Regardless of content, the tone of voice [could] be high or low pitched, as long as the voice tone [indicated] excitement, pleasure, or favor” (Anderson, 2010). Unfavorable affect was defined as the child “[engaging in vocalizations such as yells, whines with a distress (examples include but not limited to pain, fear, etc.), or screams which may or may not [have been] accompanied by physically retreating or protesting or [assuming] a facial expression [including] grimace (child or instructor [assumed] a facial expression indicating disapproval or dissatisfaction or disgust, characterized by stretching of the mouth backwards or forward (pucker of lips), crunching upward of cheeks and nose), smirk ([instructor] assumes a facial expression indicating un-sureness, self-consciousness, doubting, characterized by an upturning of one side of the mouth, usually accompanied with a sigh, or ‘uh’), or eye roll ([instructor] rolls eyes by raising eye brows diverting eyes from the child, usually following an undesirable event)” (Anderson, 2010). Neutral affect was defined as the child “[assuming] a facial expression or [emitting] vocalizations indicating indifference. The child [did] not appear to be decidedly happy or particularly unhappy. There [were] no obvious signs of favorable or unfavorable affect” (Anderson, 2010).

Stereotypical behavior was generally defined as repetitive movements or vocalizations that had no apparent adaptive function (adapted from Baumeister & Forehand (1973), Berkson & Davenport (1962), and Kennedy, Meyer, Knowles, and Shukla (2000)). For Whitney, stereotypical behavior was defined as the child touching her pinky and ring finger together, leaving a space between the middle and ring finger, and touching the middle finger and pointer finger together while extending the thumb all on the same hand (much like Spock in *Star Trek™*). Gracie had two topographies of stereotypical behavior. The first was defined as the child moving her fingers back and forth while positioning them in front of her eyes. The second was defined as the child moving her fingers back and forth on top of an object or body part while looking at it. Tiff's stereotypical behavior was defined as the child furrowing her eyebrows while raising her cheeks until her eyes shut. This may or may not have been accompanied by the child opening her mouth to the fullest extent or pushing her clenched hands against her chin.

Disruptive behavior was defined as any instance of challenging behavior that altered the environment around the child in a negative way or directly harmed the child, instructor, or peers. This included instances of vocal disruption, aggression towards other children, aggression towards instructors, eloping from the classroom, or self-injurious behavior.

#### Interobserver Agreement

Interobserver agreement (IOA) was collected across at least 33% of samples across all conditions. IOA was collected by multiple trained observers. Training included reviewing the targeted behaviors and the data sheet, practicing collecting data, and receiving feedback from

the researcher. In addition to training, all observers had a bachelor's degree or higher, were familiar with the field of behavior analysis, and worked or volunteered at the autism treatment center.

To calculate for IOA, the number of agreement intervals was divided by the total number of intervals and multiplied by 100 for each measure. Agreement on Whitney's measures were 87% (affect), 78% (social attending), 85% (on-task behavior), 97% (stereotypic behavior), and 97% (disruptive behavior). For Gracie, agreement was 95% (affect), 74% (social attending), 82% (on-task behavior), 95% (stereotypic behavior), and 97% (disruptive behavior). For Tiff, agreement was 87% (affect), 77% (social attending), 82% (on-task behavior), 95% (stereotypic behavior), and 97% (disruptive behavior).

## RESULTS

Overall, the addition of a dance party to the treatment routine of these children had no effect on the on-task behavior, social attending, disruptive behavior, or stereotypic behavior. However, children did have high levels of favorable affect during the dance party activity.

Figure 1 shows the number of steps that each participant took during each dance party. There was variability for each participant from dance party to dance party.

Figure 2 shows within-condition behavior averages (social attending, favorable affect, on-task behavior, disruptive behavior, and stereotypic behavior) across all observation settings for each child. Dance party appeared to have no effect on social attending, on-task behavior, disruptive behavior, or stereotypic behavior. However, children had favorable affect in a higher percentage of intervals during dance party conditions than during baseline conditions. From baseline to dance party conditions, social attending and on-task behavior remained high while stereotypic and disruptive behaviors remained low. Figure 3 shows within condition behavior averages grouped by observation setting averages (snack, dance party, social skills group, art time, and game time) across all children. Dance party appeared to have no effect on social attending, on-task behavior, disruptive behavior, or stereotypic behavior, however children did have higher percentages of favorable affect during dance party conditions. Figure 4 shows behavior averages (social attending, on-task behavior, favorable affect, disruptive behavior, and stereotypic behavior) across all settings by child. It appears that dance party had no effect on social attending, on-task behavior, disruptive behavior, or stereotypic behavior. Whitney had noticeably higher percentages of favorable affect during dance party conditions while Gracie and Tiff had slightly higher percentages of favorable affect during dance party.

Figure 5 shows Whitney's affect (favorable, unfavorable, and neutral) across setting sequences for each day. During snack, social skills group, art time, and game time, Whitney's neutral affect generally remained high while unfavorable and favorable affect generally remained low with some variability. During dance parties, Whitney's favorable and neutral affect were high and unfavorable affect remained low with the exception of one day when a new song ("Call Me Maybe" by Carly Rae Jepsen) was played for the first time. Figure 6 shows Whitney's on-task behavior and social attending across setting sequences for each day. Across all conditions, Whitney's on-task behavior and social attending remained variable, yet high. Figure 7 shows Whitney's stereotypical and disruptive behavior across setting sequences for each day. Across all conditions, Whitney's stereotypical behavior remained low and her disruptive behavior, although it varied, did not increase nor decrease noticeably from condition to condition.

Figure 8 shows Gracie's affect (favorable, unfavorable, and neutral) across setting sequences for each day. During snack, social skills group, art time, and game time, Gracie's neutral affect generally remained high while unfavorable and favorable affect generally remained low with some variability. During dance parties, Gracie's neutral affect was high, favorable affect was moderate, and unfavorable affect remained low. Figure 9 shows Gracie's on-task behavior and social attending across setting sequences for each day. Across all conditions, Gracie's on-task behavior and social attending remained variable, yet high. Figure 10 shows Gracie's stereotypical and disruptive behavior across setting sequences for each day. While both stereotypical and disruptive behavior varied day-to-day, they both remained low across all conditions.

Figure 11 shows Tiff's affect (favorable, unfavorable, and neutral) across setting sequences for each day. During snack, social skills group, art time, and game time, Tiff's neutral affect generally remained high while unfavorable and favorable affect generally remained low with some variability. During dance parties, Tiff's favorable and neutral affect were high and unfavorable affect remained low. Figure 12 shows Tiff's on-task behavior and social attending across setting sequences for each day. Across all conditions, Tiff's on-task behavior and social attending remained variable. Figure 13 depicts Tiff's stereotypical and disruptive behavior across setting sequences for each day. Across all conditions, Tiff's disruptive behavior remained low while her stereotypic behavior varied from day-to-day with no noticeable difference from condition to condition.

Figure 14 shows social attending for all children across setting sequences for each day. Across all conditions, there continued to be variable, yet high, levels of social attending with particularly high levels during dance party activities. Figure 15 depicts on-task behavior for all children across setting sequences for each day. There was no change from condition-to-condition; levels of on-task behavior remained variable. Figure 16 displays favorable affect for all children across setting sequences for each day. Throughout snack, social skills group, art time, and game time across conditions, there was some variability however levels of favorable affect remained low. During the dance party, all children saw an increase in favorable affect. Figure 17 shows disruptive behavior for all children across setting sequences. Whitney and Gracie had variability in disruptive behavior across conditions, however levels of disruptive behavior remained low. Across all conditions, Tiff's disruptive behavior remained low if it occurred at all. Figure 18 depicts stereotypic behavior for all children across setting sequences

for each day. Whitney's stereotypic behavior remained low across all conditions, Gracie's stereotypic behavior had some variability throughout conditions, but remained low as well. Tiff's stereotypic behavior had variability throughout all conditions and ranged from low to moderate rates.





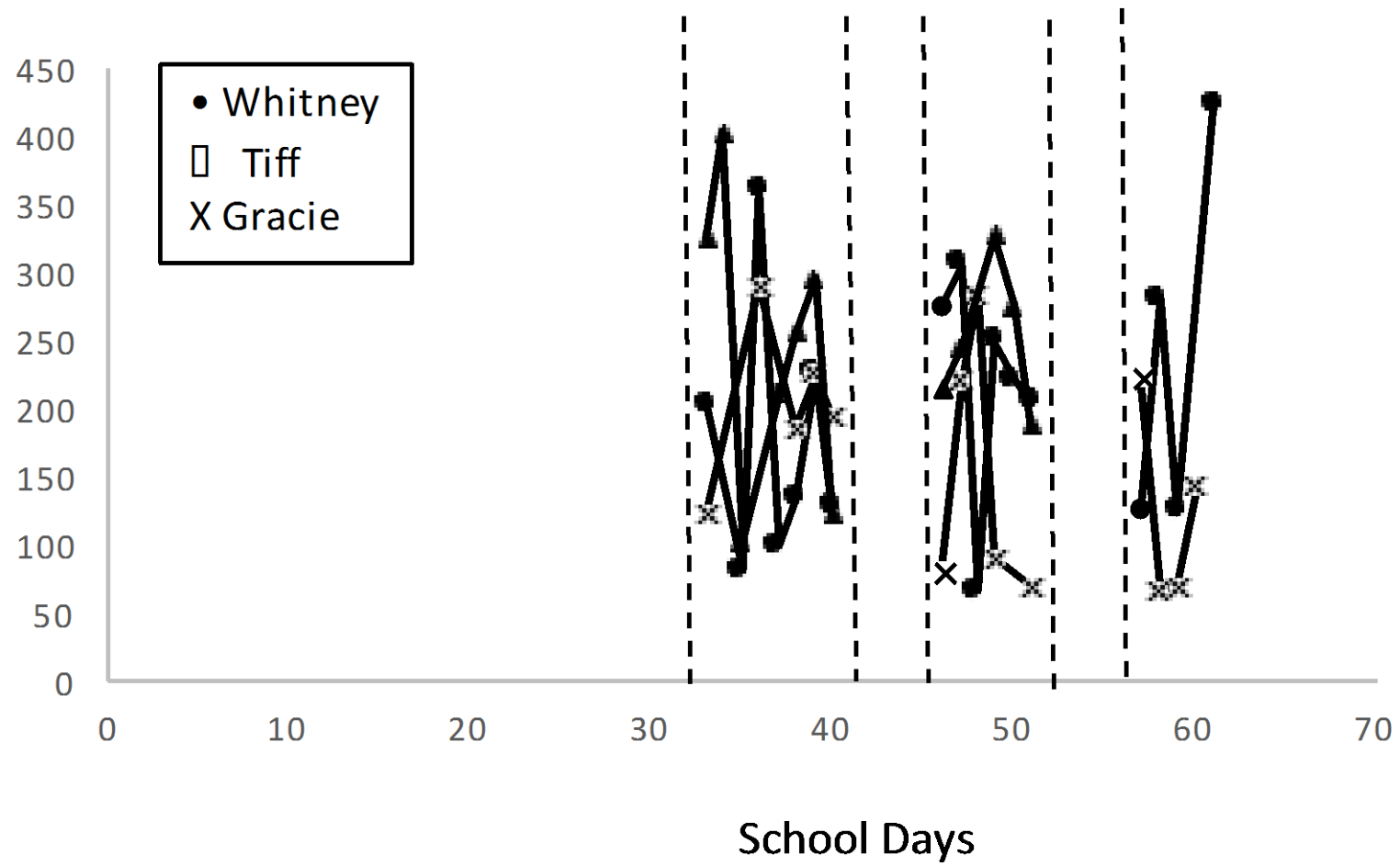


Figure 1. Numbers of steps taken during each dance party by participant.

# Behavior Averages Across All Observation Settings

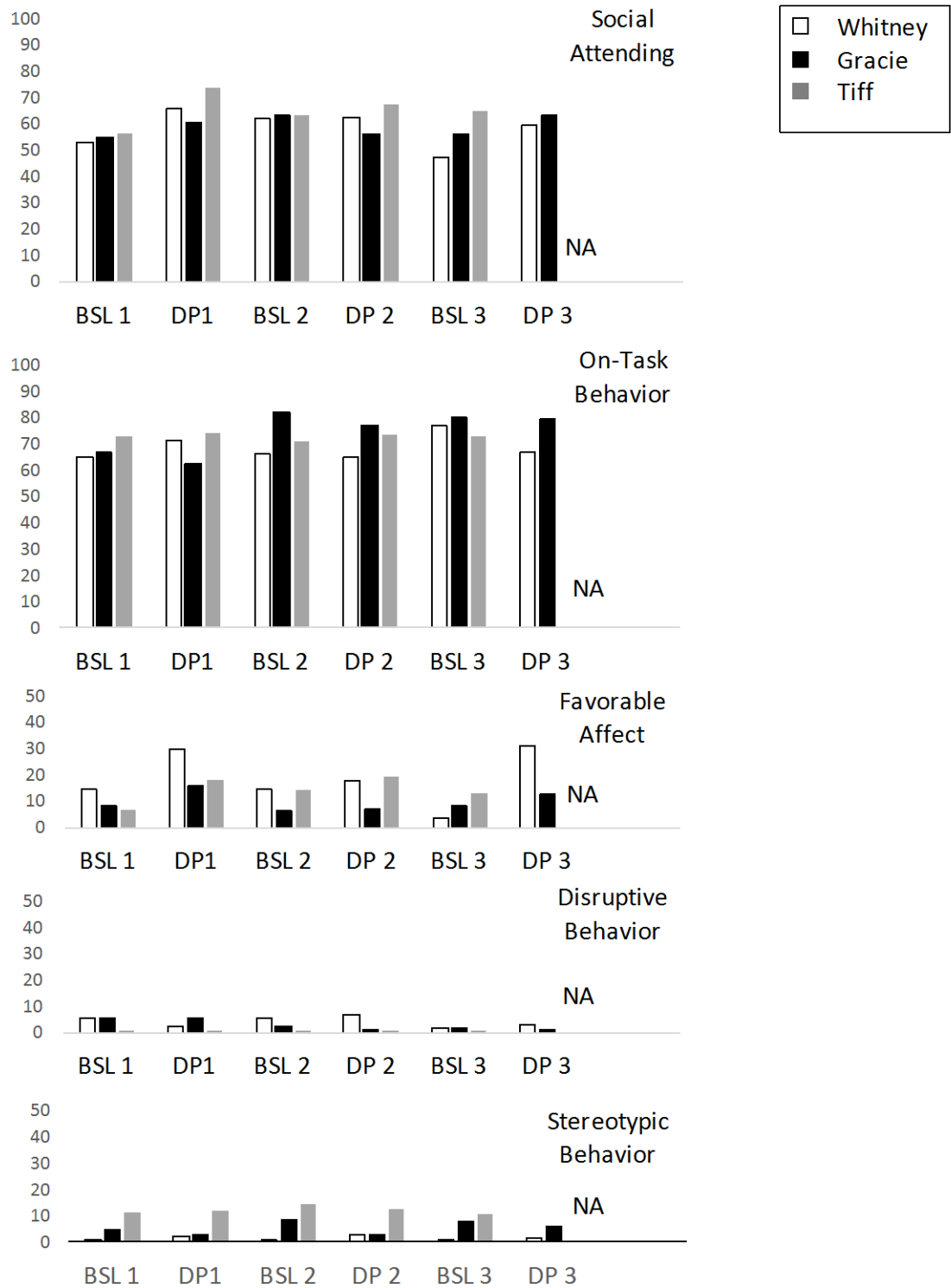


Figure 2. Behavior averages for each child across all observation settings.

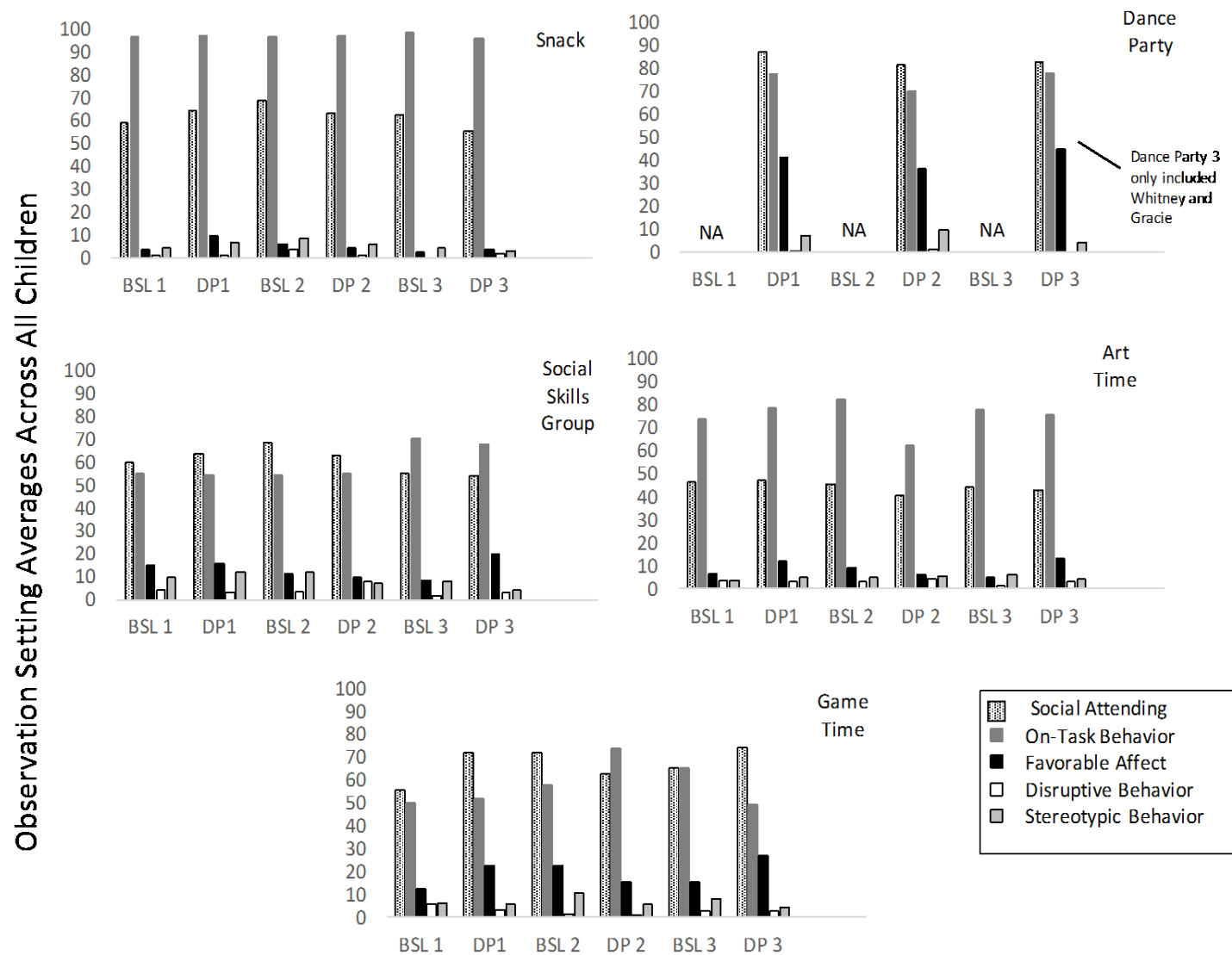


Figure 3. Behavior averages for all participants by setting sequences (left to right across day).

# Behavior Averages Across All Settings

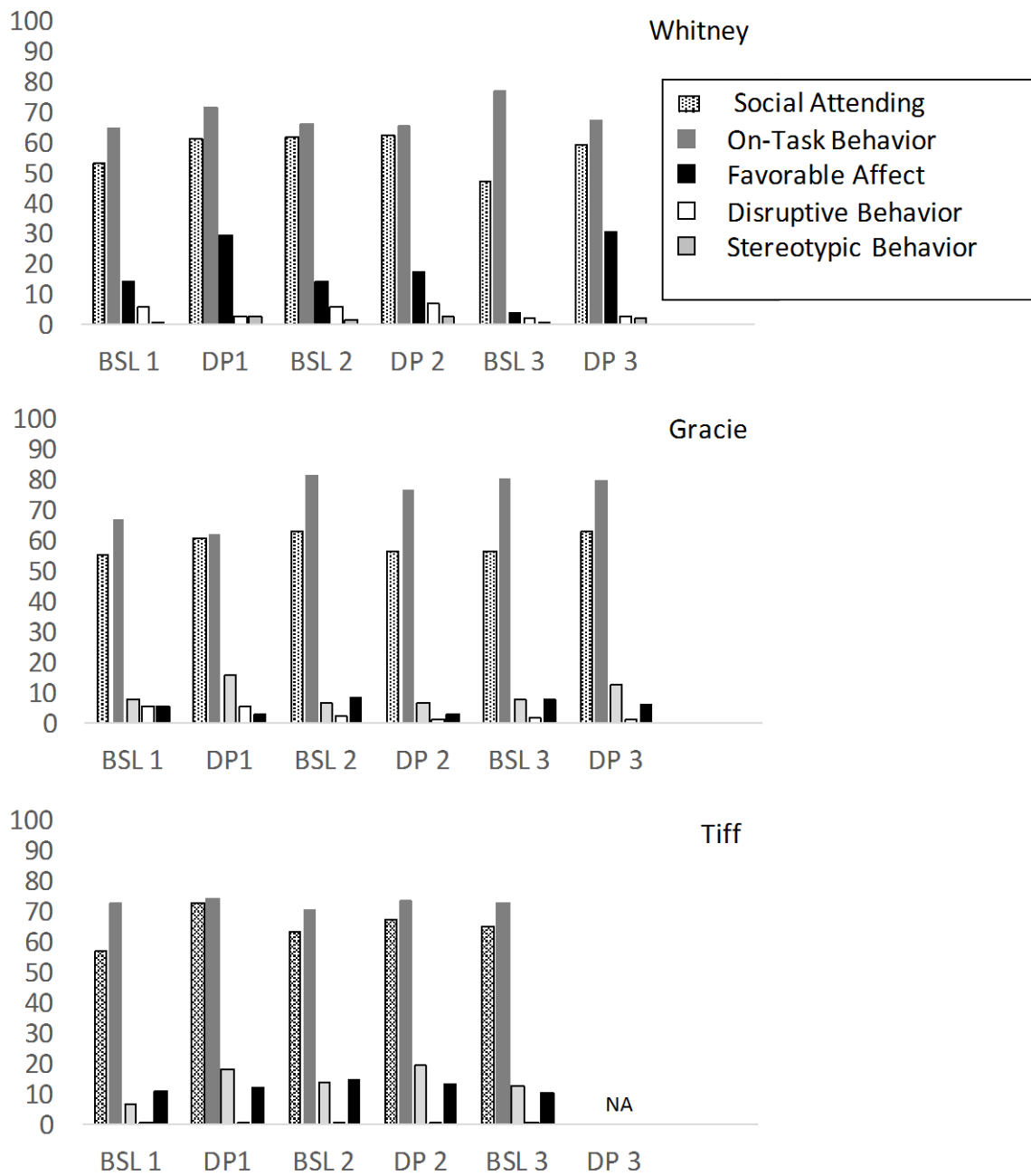


Figure 4. Behavior averages for each child across all observation settings.

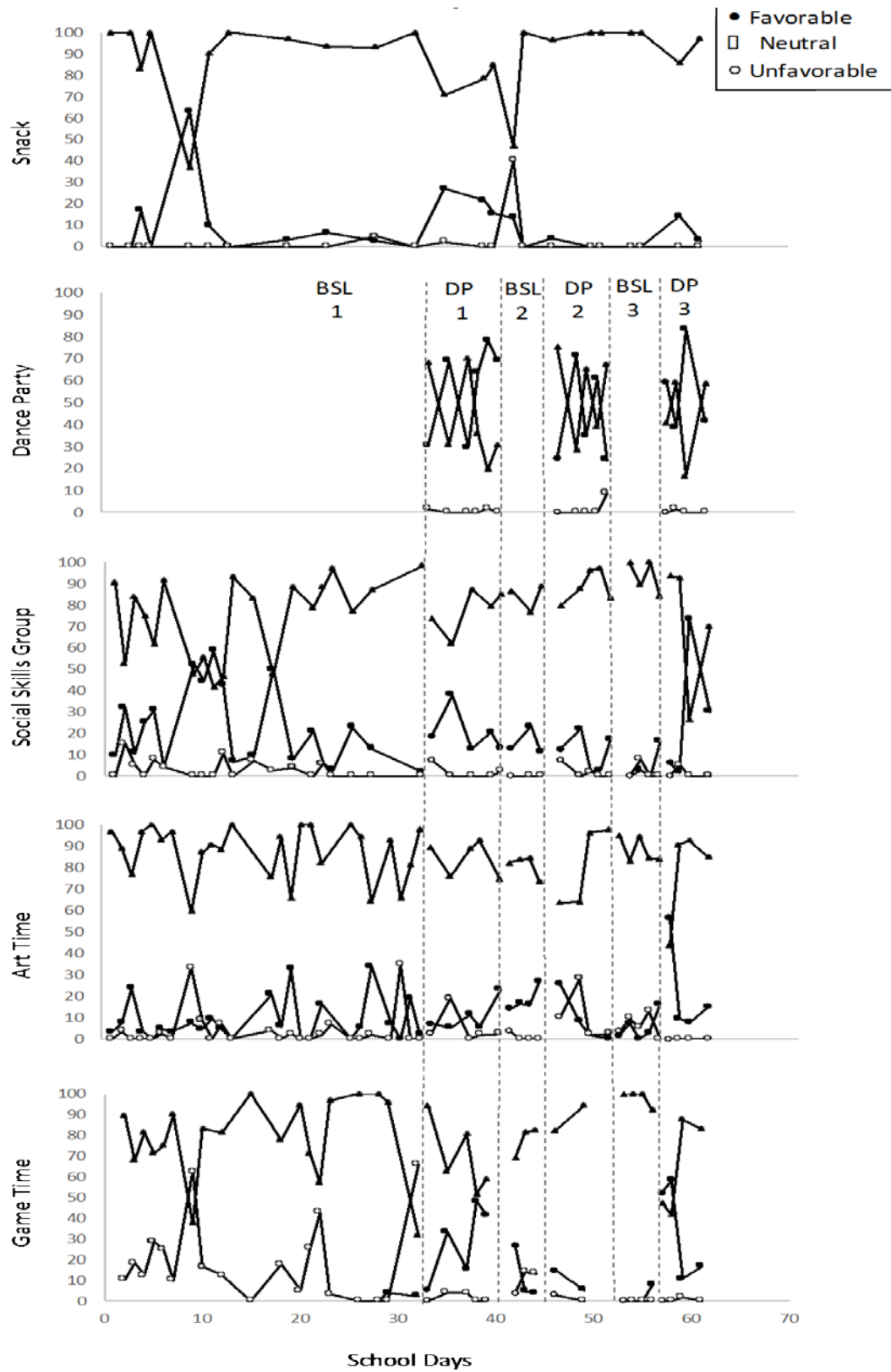


Figure 5. Percentages of intervals with favorable, unfavorable, and neutral affect for Whitney by setting sequences.

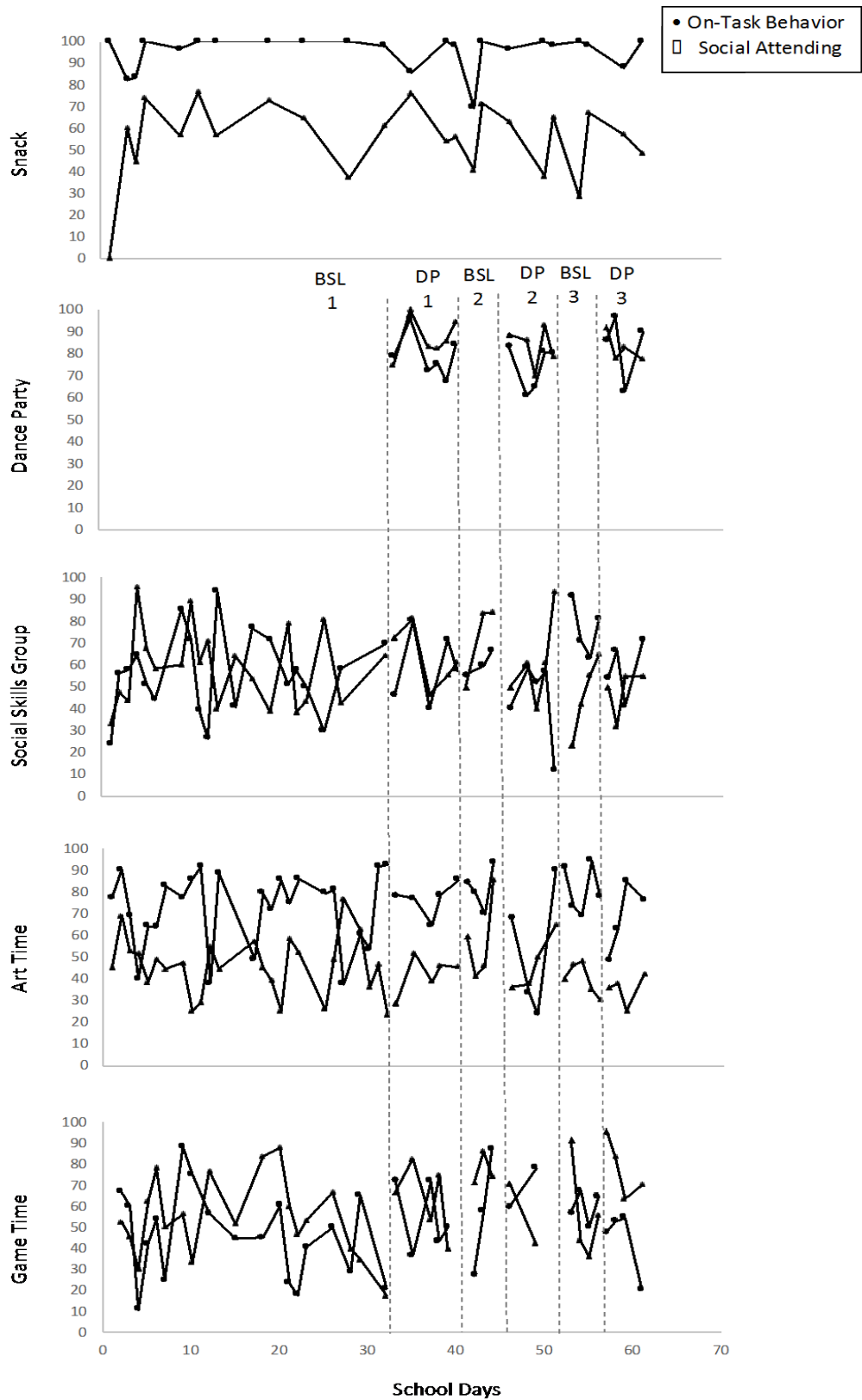


Figure 6. Percentage of intervals with social attending and on-task behavior for Whitney by setting sequences.

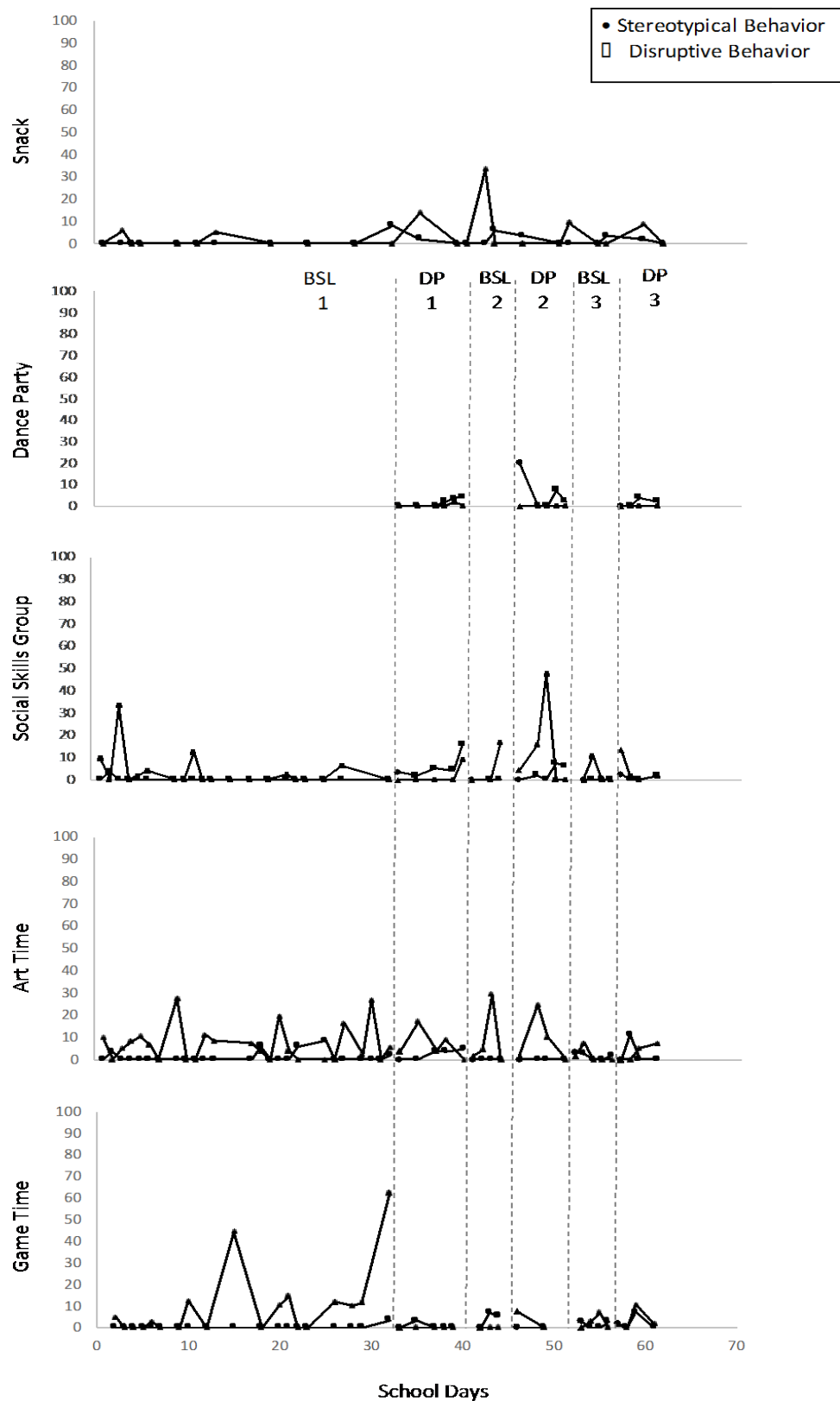


Figure 7. Percentage of intervals with stereotypic and disruptive behavior for Whitney by setting sequences.



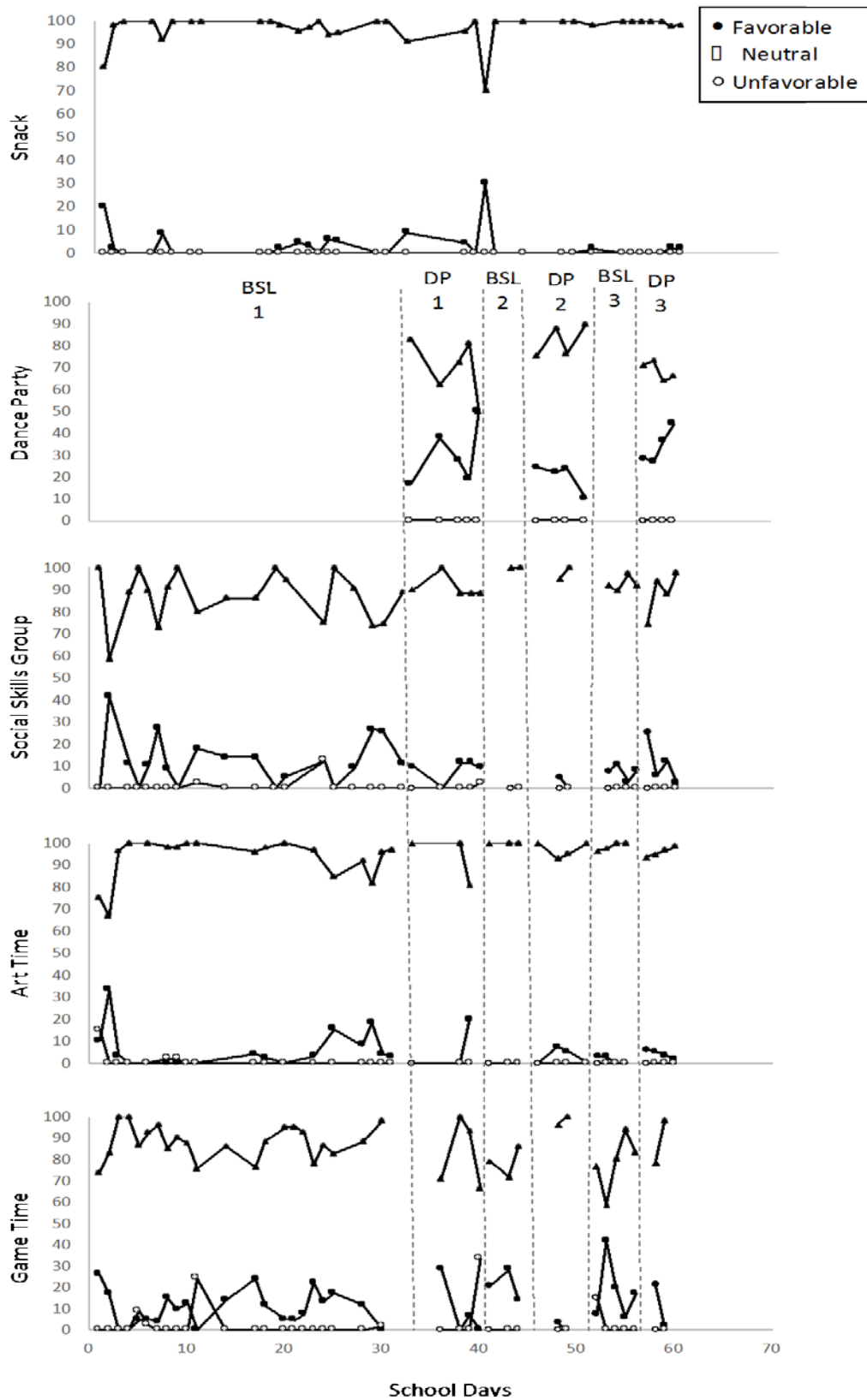


Figure 8. Percentage of intervals with favorable, unfavorable, and neutral affect for Gracie by setting sequences.

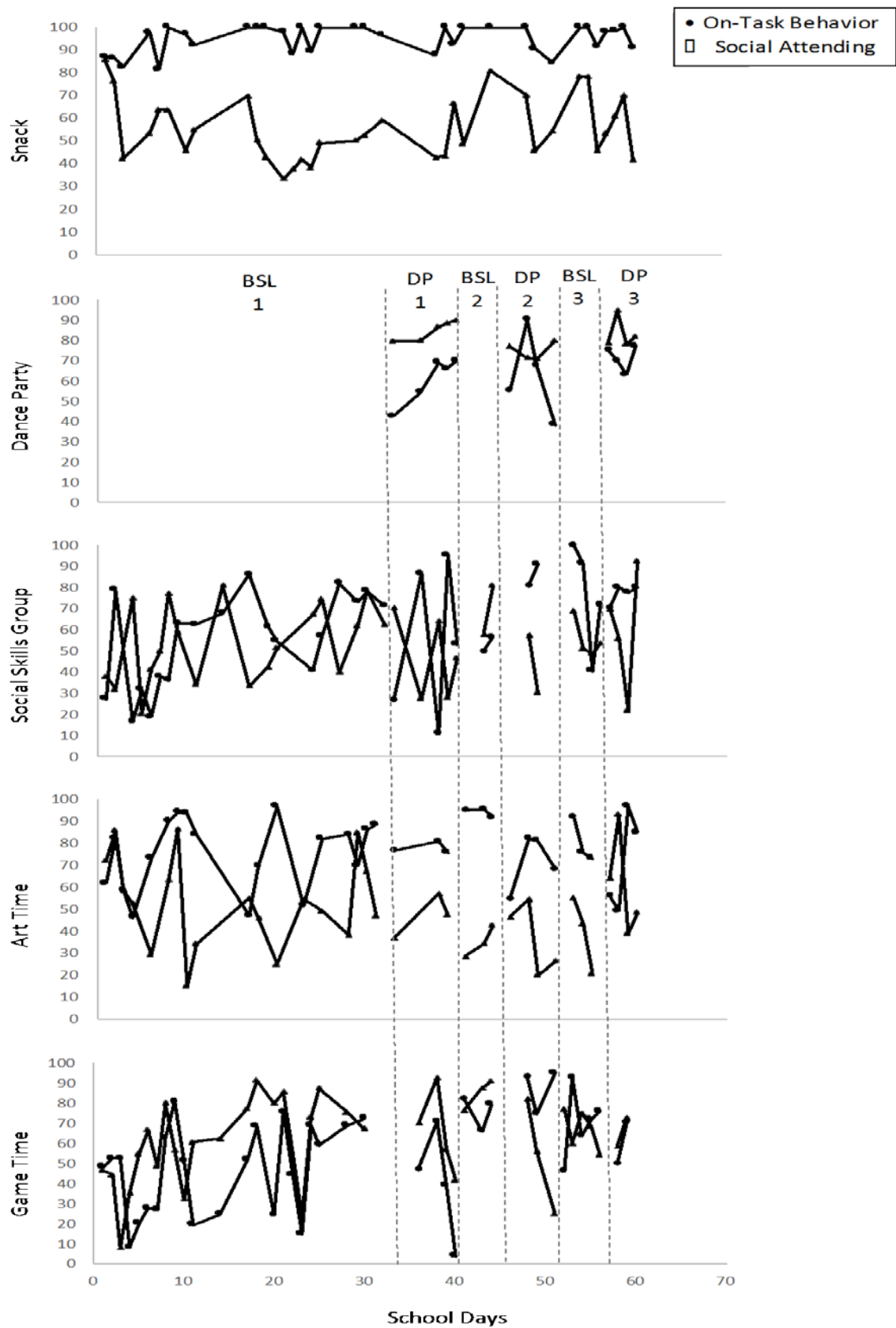


Figure 9. Percentage of intervals with social attending and on-task behavior for Gracie by setting sequences.

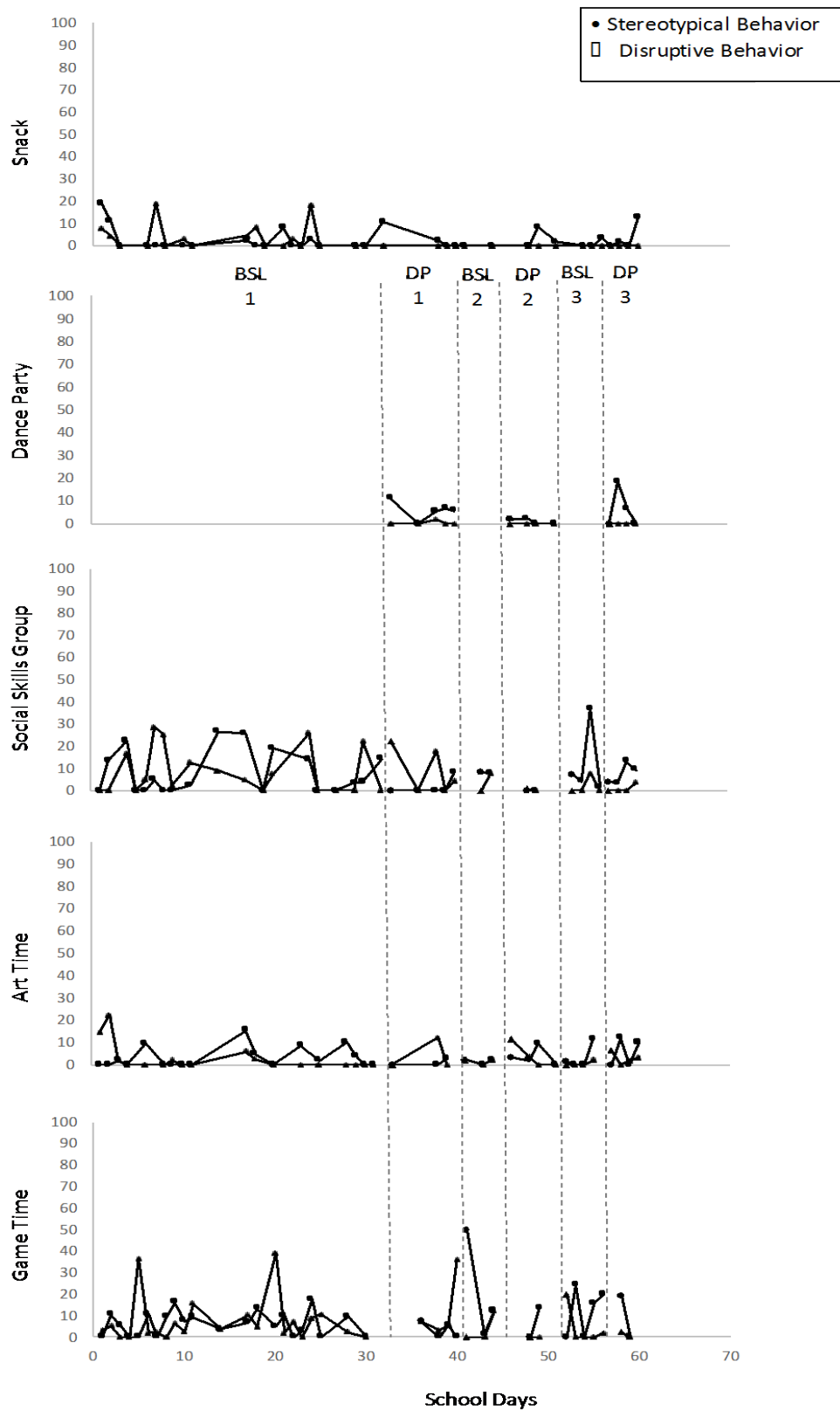


Figure 10. Percentage of intervals with stereotypic and disruptive behavior for Gracie by setting sequences.

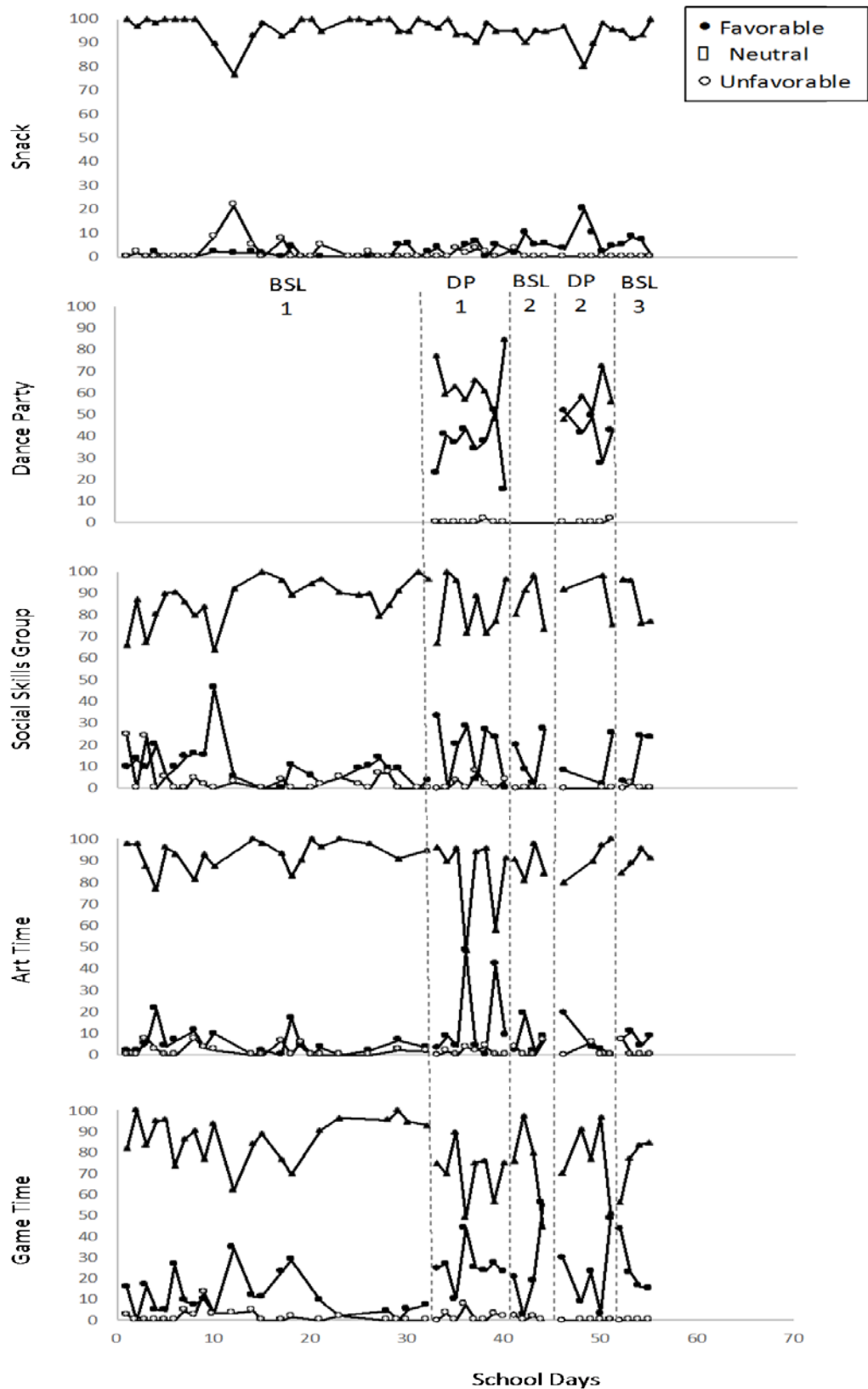


Figure 11. Percentage of intervals with favorable, unfavorable, and neutral affect for Tiff by setting sequences.

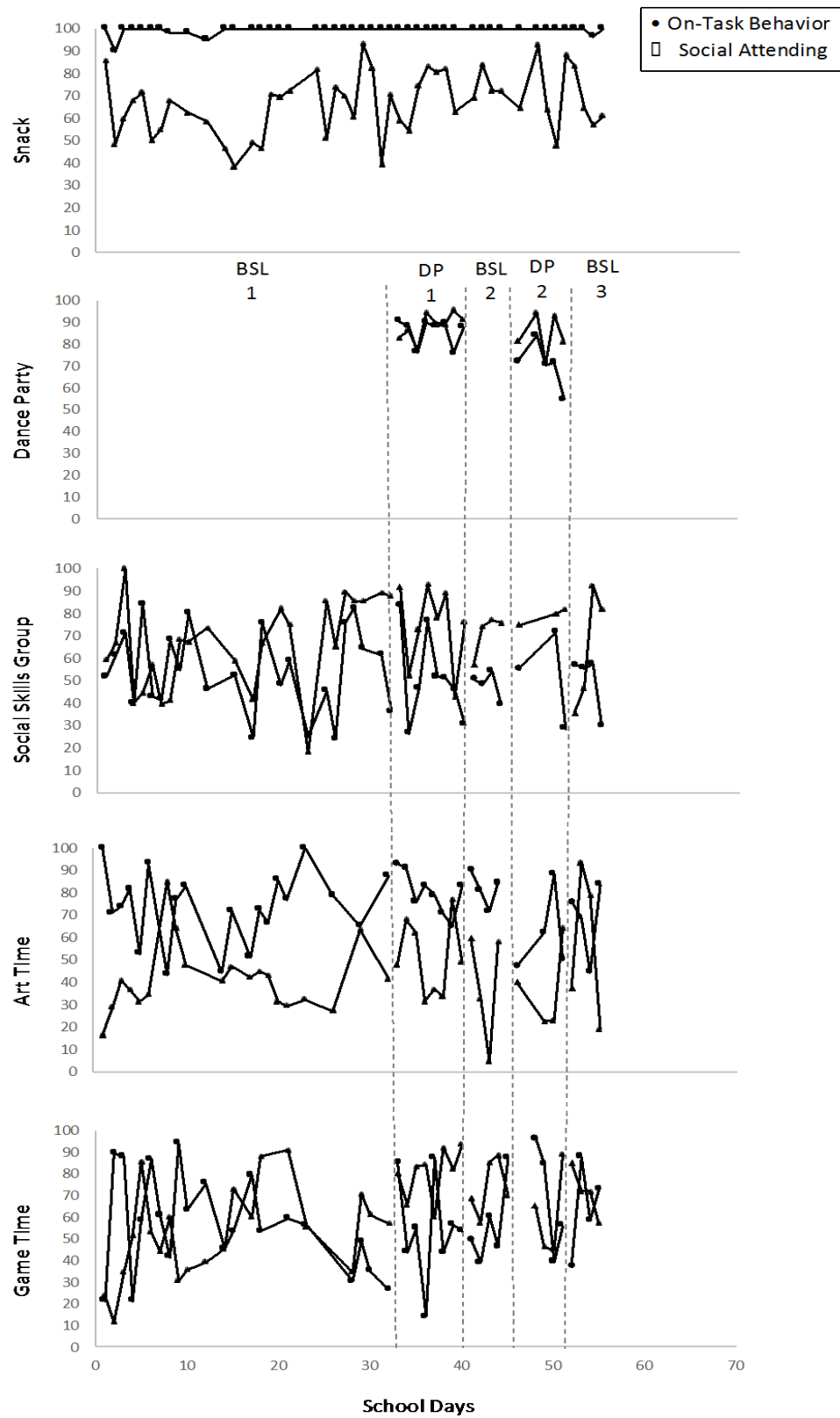


Figure 12. Percentage of intervals with social attending and on-task behavior for Tiff by setting sequences.

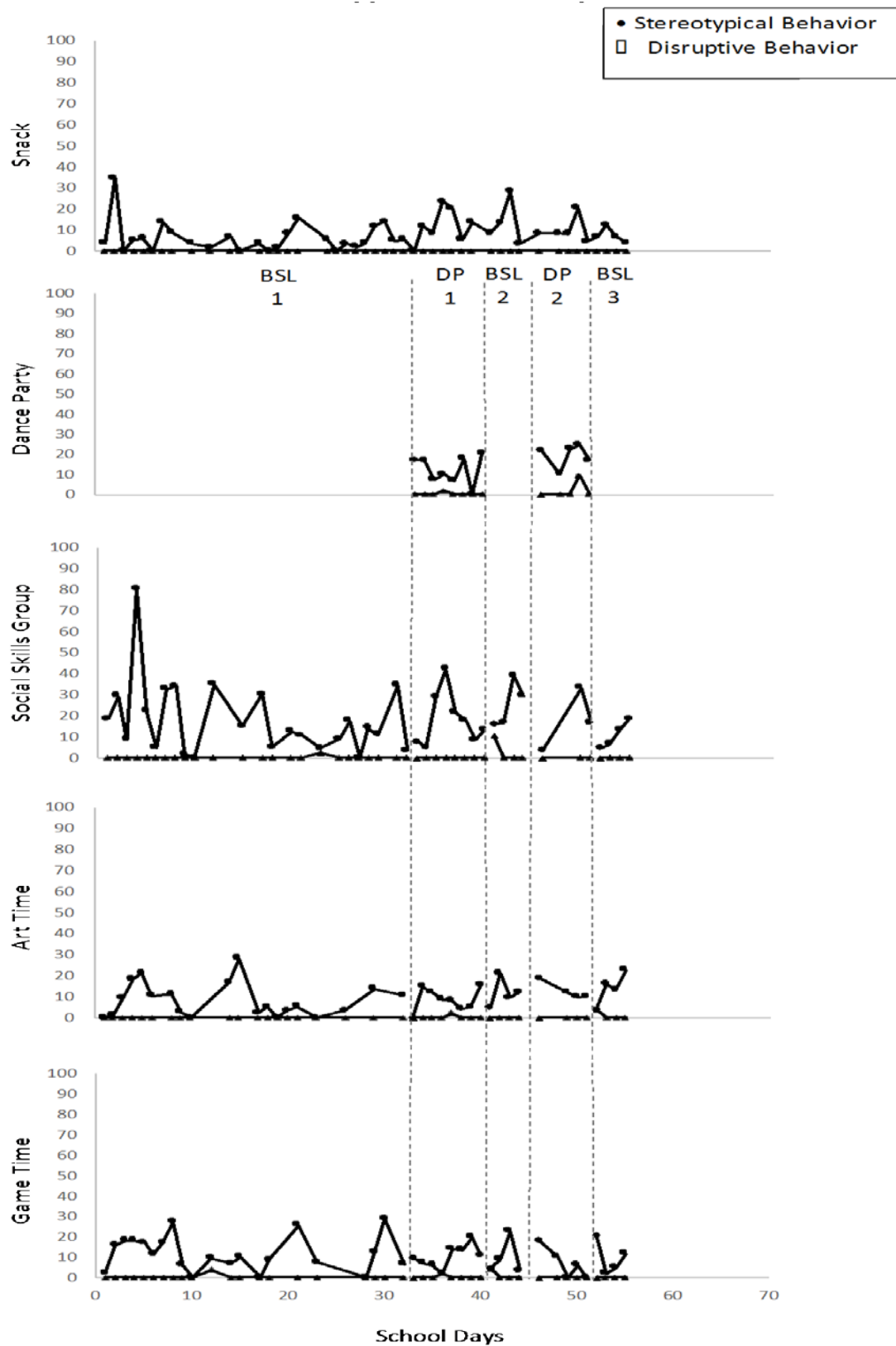


Figure 13. Percentage of intervals with stereotypic and disruptive behavior for Tiff by setting sequences.

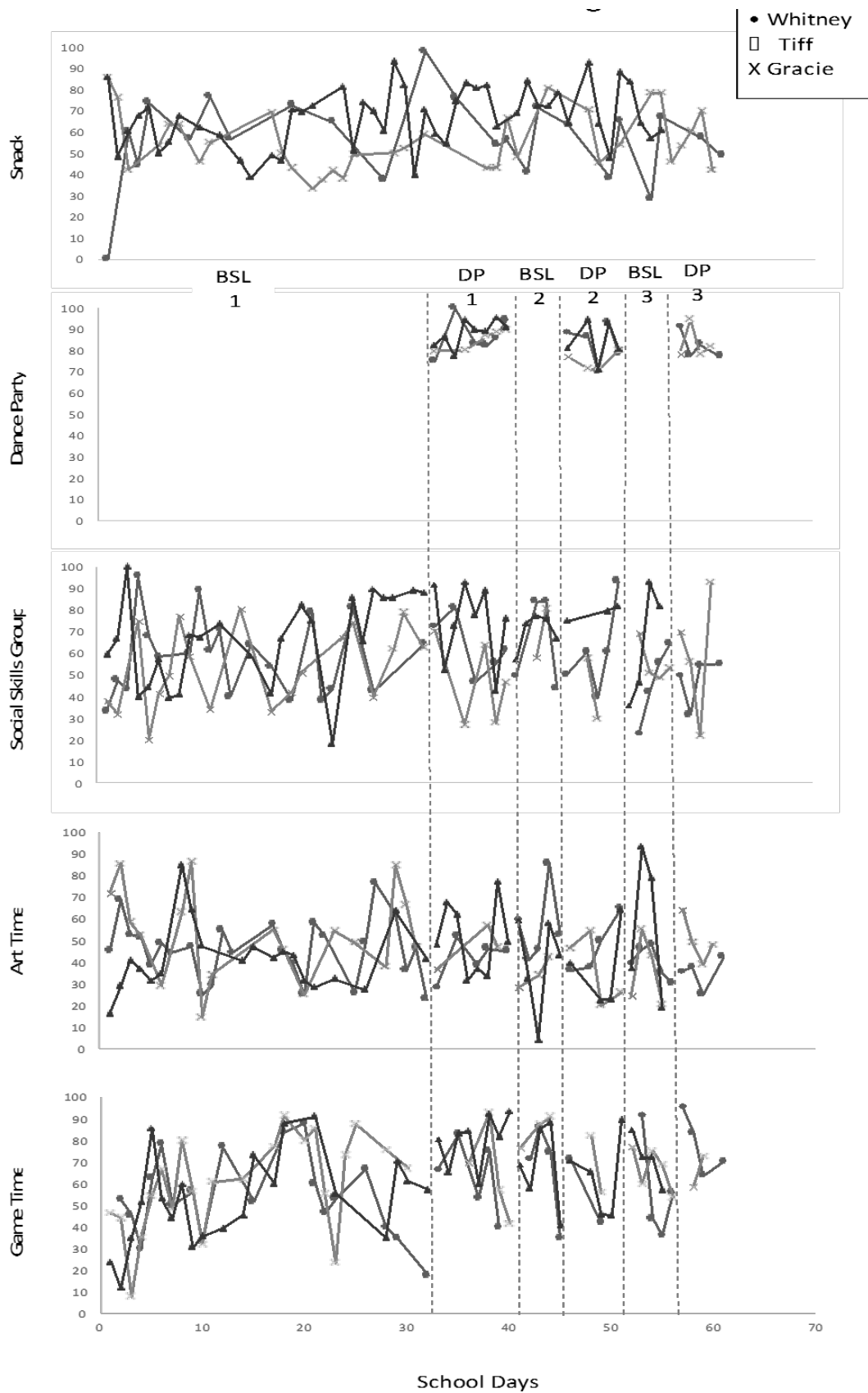


Figure 14. Percentage of social attending for each child by setting sequences.

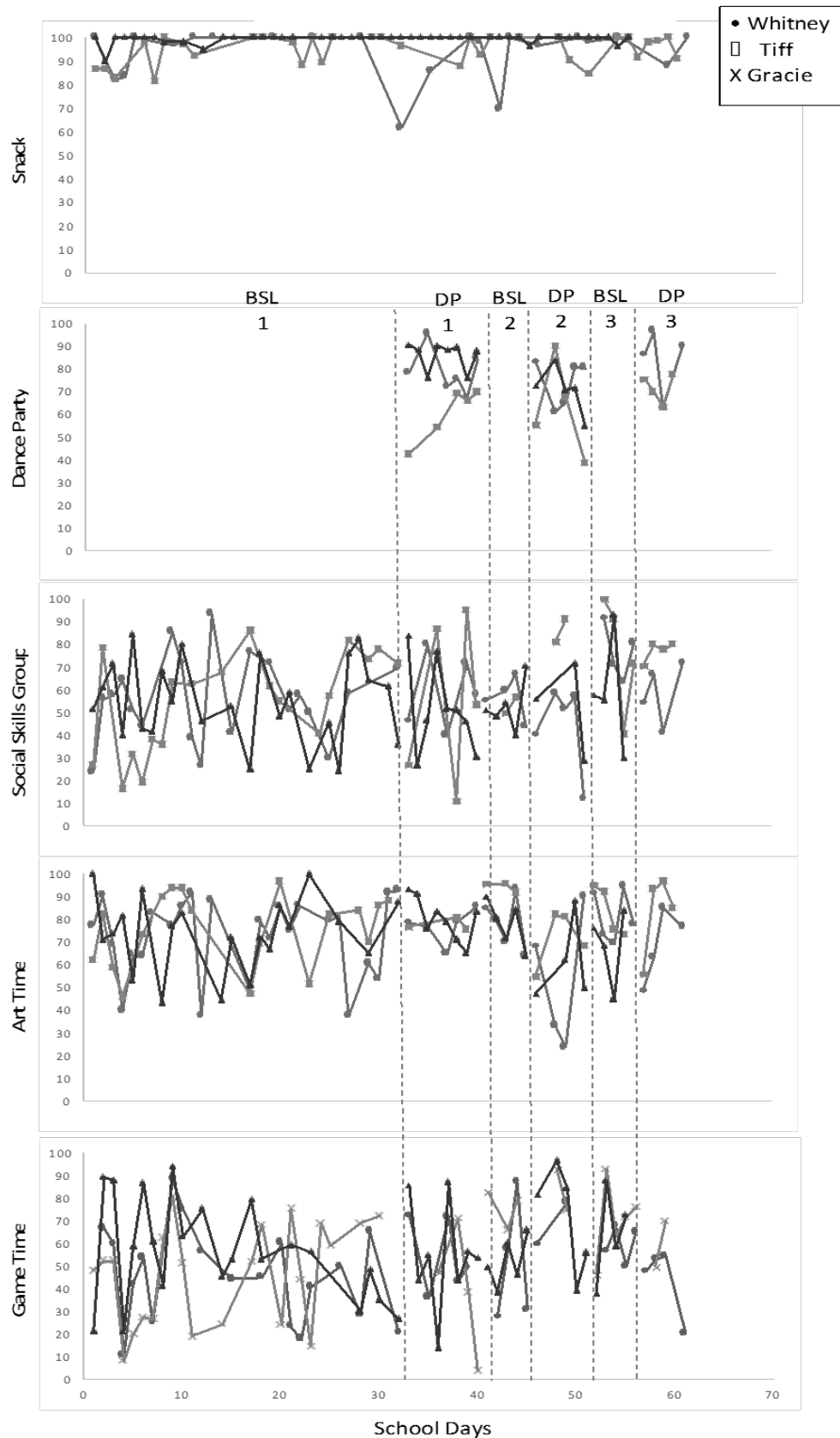


Figure 15. Percentage of on-task behavior for each child by setting sequences.



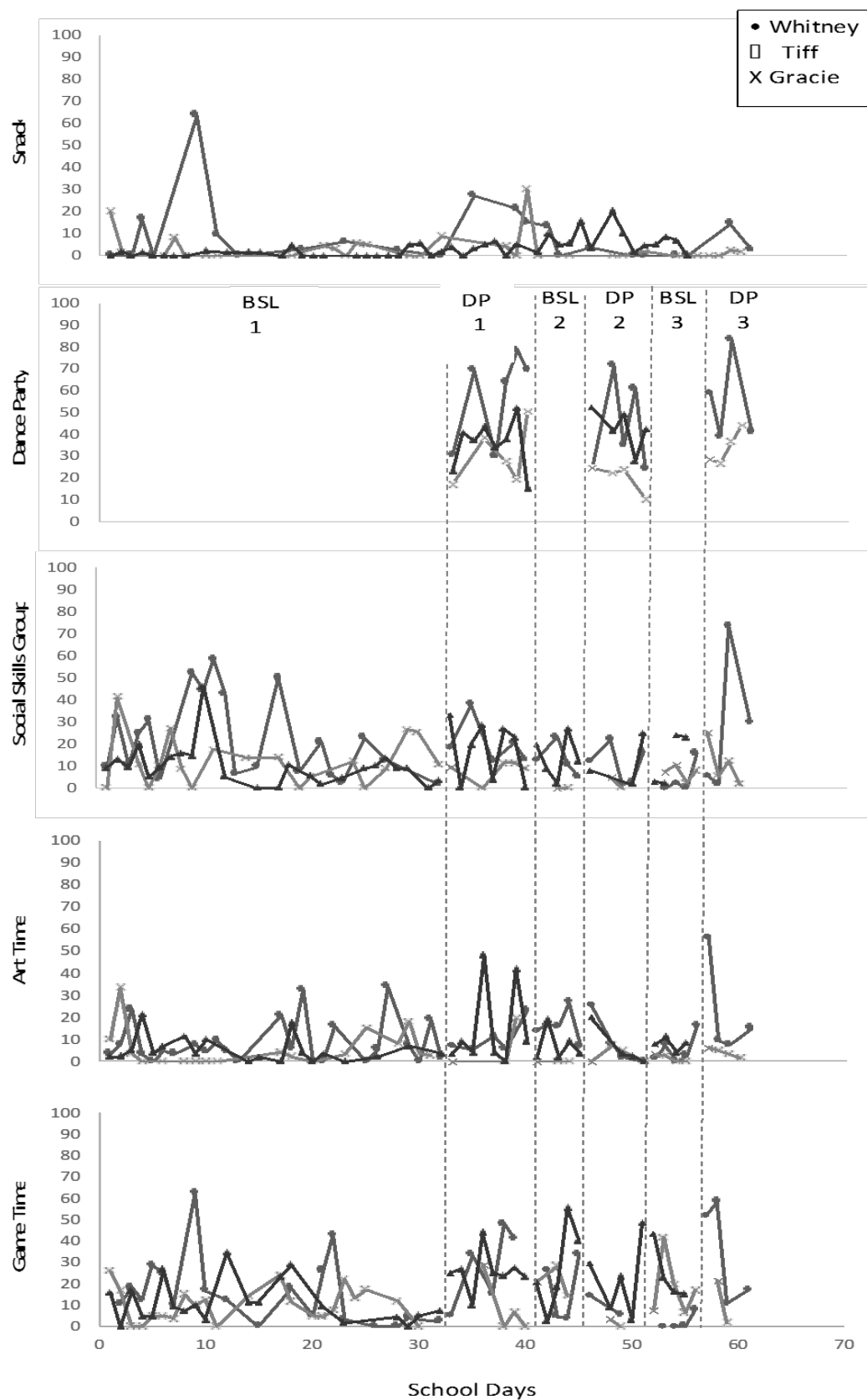


Figure 16. Percentage of favorable affect for each child by setting sequences.

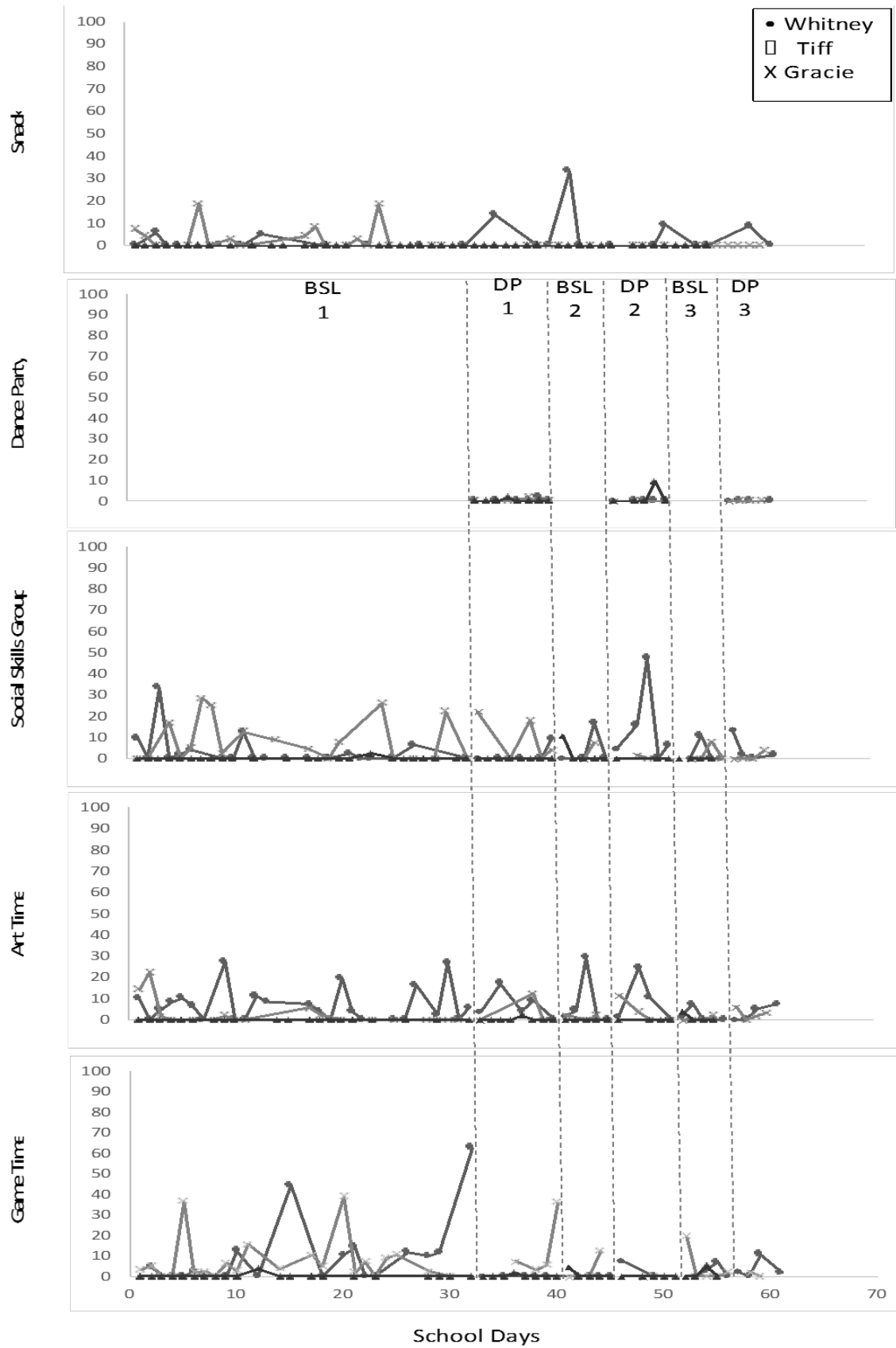


Figure 17. Percentage of disruptive behavior for each child by setting sequences.

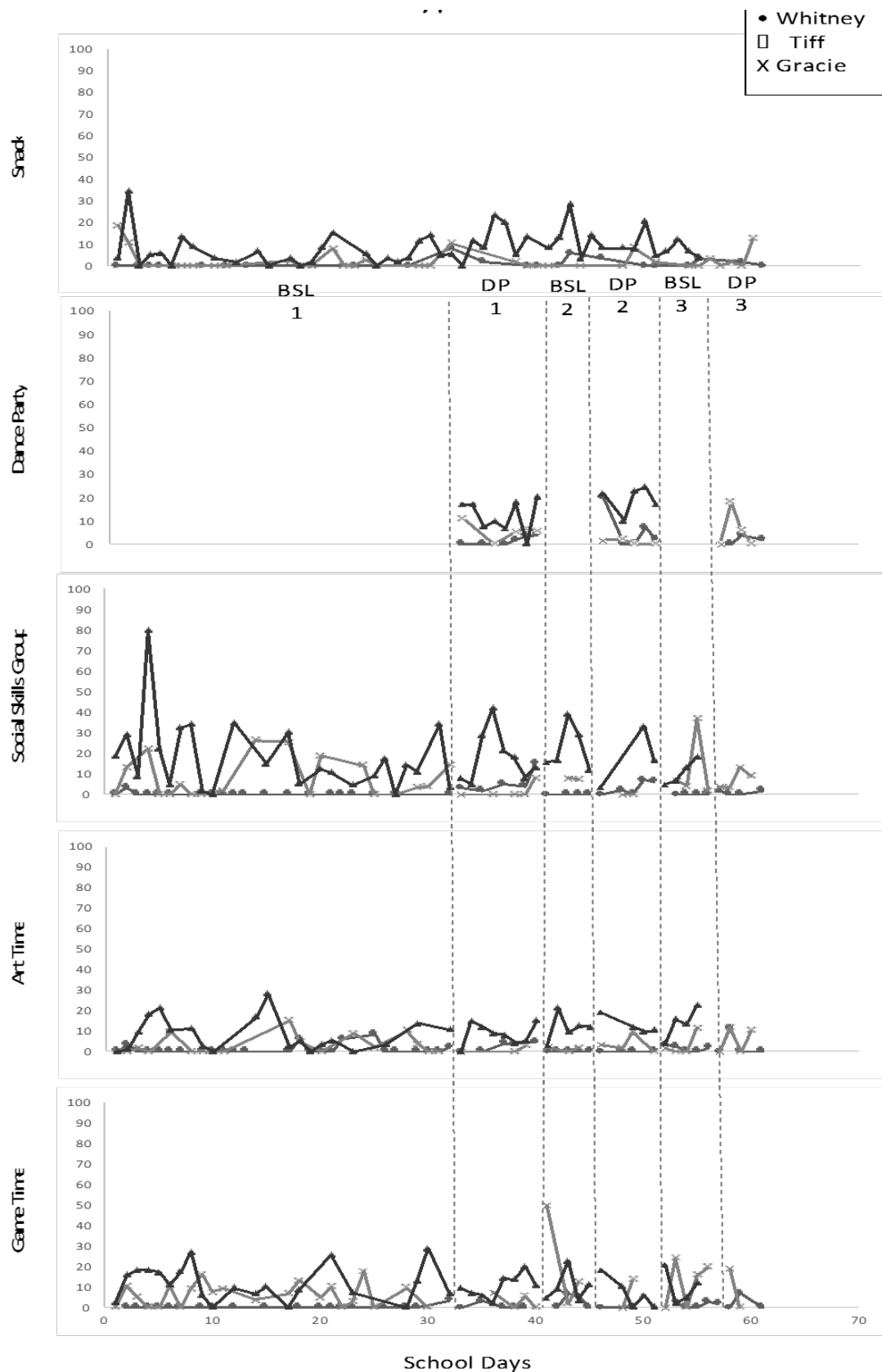


Figure 18. Percentage of stereotypic behavior for each child by setting sequences.

## DISCUSSION

The purpose of this study was to evaluate the effects of a group dance period on on-task behavior, social attending, affect, stereotypic behavior, and disruptive behavior of three female children with autism. Specifically, the study sought to evaluate if there was an increase in on-task behavior and social attending during group activities following a group dance period while also evaluating if there was a decrease in disruptive and stereotypic behaviors in subsequent activities.

Throughout baseline and dance party conditions levels of on-task behavior, social attending, affect (favorable, neutral, and unfavorable), stereotypic behavior, and disruptive behavior remained variable during snack, group, art, and game times. During the dance party activity, all participants had moderate-to-high levels of on-task behavior, social attending, and favorable affect, while stereotypic and disruptive behaviors remained low. The moderate-to-high levels of favorable affect during the dance party activity indicate that the participants likely enjoyed the dance party activity. In fact, two of the girls would request for dance party or specific songs.

While the dance party did not result in any consistent changes in on-task behavior, social attending, stereotypic, or disruptive behaviors, it taught the children a new leisure skill that they can engage in throughout different environments and with a variety of people. During dance parties, the children also had high levels of favorable affect (smiling, laughing, etc.). It is also important to note that there were no increases in disruptive or stereotypic behaviors nor were there decreases in on-task behavior or social attending after the dance parties. The children's levels of favorable affect during the dance party as well as anecdotal observations

that Gracie was requesting the dance party indicate that the participants likely enjoyed the dance party. Thus, children still gained value from this intervention by acquiring a new activity that was enjoyable.

During the dance activity, high levels of favorable affect were observed. This might be due to the dance party being an enjoyable activity, the upbeat music being a preferred stimulus, or even the possibility of endorphins being released during the physical activity (Rokade, 2011). That the children enjoyed the activity was supported by anecdotal observations. For example, Gracie requested the dance party during the third reversal to baseline condition, and Gracie and Whitney frequently requested that the song “No Crust” be played.

The current study evaluated a cardio-type (dance) activity as many other studies have done (Bachman & Fuqua (1983), Celiberti, Bobo, Kelly, Harris, & Handleman (1997), Neely, Rispoli, Gerow, & Ninci (2015), Miramontez & Schwartz (2016)). Many of the evaluated studies speculated that fatigue and physical consequences could account for changes in behavior associated with exercise; it is possible that similar results were not seen in this study because of the short duration of the dance activity. None of these studies were designed to differentiate between physical fatigue (exhaustion) and satiation, which poses the question: are they the same thing? Satiation is defined “as a decrease in the effectiveness of a reinforcer with its repeated consumption” (McSweeney, 2004). It is not feasible to argue that satiation and exhaustion are the same thing, although they may often go hand-in-hand. While an individual may be physically exhausted, they may still engage in behaviors (though perhaps at a lower rate) to gain access to a reinforcer (not satiated). For example, one might go dancing with

friends until physically exhausted, but still continue to dance. On the other hand, an individual may be satiated but not physically exhausted. For example, after dancing with friends for a couple of hours, one may become satiated on dancing and then go swimming (showing a lack of physical exhaustion).

It is likely that there were no changes in subsequent activities during the dance party condition because, although they were variable, on-task behavior and social attending were already occurring at high rates. Stereotypic and disruptive behaviors remained unchanged, likely because they were already occurring at low rates if they occurred at all.

There also could have been minimal effects because the baseline levels were at relatively aim levels. That is, the children were socially attending and on-task at high levels and stereotypic and disruptive behaviors were very low. Finally, it is possible that exercise has no effect on social attending, on-task behavior, stereotypic behavior, or disruptive behavior under these conditions.

It is also possible that the dance in party in this study showed little impact because, contrary to the literature base for exercise and on-task behavior, stereotypical behavior, and disruptive behavior, which involved primarily male participants, all participants in this study were female. 17 of the 20 participants in the reviewed literature were male, which reflects the statistic that males have a higher prevalence of autism than their female peers (Christensen et al., 2012). However, of the three female participants in the evaluated literature, all saw similar outcomes compared to their male counterparts, making it unlikely that the results of this study were due to the sex of the participants.

This study evaluated the effects of a group dance period on the social attending, on-task behavior, affect, stereotypic behavior, and disruptive behavior of three female children diagnosed with autism spectrum disorder. During baseline, data was variable and continued to be variable during dance party conditions. While dance is fun in and of itself, future studies might evaluate other measures such as effect on children's social interactions, attending, and imitation. Furthermore, it might be useful to evaluate the teachers' enjoyment and responding during and after dance conditions to determine if this might affect outcomes.

APPENDIX A  
SETTING PICTURE





## APPENDIX B

### DATASHEET

Child: \_\_\_\_\_  
 Date of Video: \_\_\_\_\_ Activity: \_\_\_\_\_

Observer: \_\_\_\_\_ Date: \_\_\_\_\_  
 Primary/Secondary (circle one)

Directions: Indicate the Affect (Favorable-F, Unfavorable-U, Neutral-N), Social Attending (SA), Non-Social Attending (NSA), On-Task Behavior (OnT), Off-Task Behavior (OfT), Stereotypic Behavior (SB), and Disruptive Behavior (DB) for each 5-second interval using partial interval recording. If the child is off-screen, mark a slash through the corresponding interval. After data collection, record the number of intervals each measure was recorded.

0-0:05	0:06-0:10	0:11-0:15	0:16-0:20	0:21-0:25	0:26-0:30	0:31-0:35	0:36-0:40	0:41-0:45	0:46-0:50	0:51-0:55	0:56-1:00	
F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	Affect
SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	Social Attending
OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	On/Off Task
SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	Stereotypical/Disruptive Behavior

1:01-1:05	1:06-1:10	1:11-1:15	1:16-1:20	1:21-1:25	1:26-1:30	1:31-1:35	1:36-1:40	1:41-1:45	1:46-1:50	1:51-1:55	1:56-2:00	
F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	Affect
SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	Social Attending
OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	On/Off Task
SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	Stereotypical/Disruptive Behavior

2:01-2:05	2:06-2:10	2:11-2:15	2:16-2:20	2:21-2:25	2:26-2:30	2:31-2:35	2:36-2:40	2:41-2:45	2:46-2:50	2:51-2:55	2:56-3:00	
F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	Affect
SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	Social Attending
OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	On/Off Task
SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	Stereotypical/Disruptive Behavior

3:01-3:05	3:06-3:10	3:11-3:15	3:16-3:20	3:21-3:25	3:26-3:30	3:31-3:35	3:36-3:40	3:41-3:45	3:46-3:50	3:51-3:55	3:56-4:00	
F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	Affect
SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	Social Attending
OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	On/Off Task
SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	Stereotypical/Disruptive Behavior

4:01-4:05	4:06-4:10	4:11-4:15	4:16-4:20	4:21-4:25	4:26-4:30	4:31-4:35	4:36-4:40	4:41-4:45	4:46-4:50	4:51-4:55	4:56-5:00	
F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	F U N	Affect
SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	SA NSA	Social Attending
OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	OnT OfT	On/Off Task
SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	SB DB	Stereotypical/Disruptive Behavior

AFFECT		
F	U	N

SA/NSA	
SA	NSA

OnT/OfT	
OnT	OfT

SB/DB	
SB	DB

Off-Screen
Intervals Off-Screen

APPENDIX C  
OBSERVATION CODE

## *Measurement Definitions*

**Social Attending:** Child/instructor is oriented towards their instructor/child/another child and is looking at, making eye contact with, gesturing towards or interacting with (e.g., engaging in tickles, talking to, playing a game with, etc.) their instructor/child/another child all with a favorable or neutral affect.

### **Examples**

During social skills group, the lead instructor is providing the group with instructions about "Conversation Ball." The child is oriented towards the lead instructor while looking directly at the lead instructor.

During snack, there are multiple children sitting at the table. The child looks at their peer as their peer exclaims "I have goldfish for lunch today!"

During art time, the child is painting an elephant. As they conclude their painting, they look to their individual instructor and say "Look at my beautiful elephant!"

During game time, the child is playing "Toilet Trouble" with their peers. They look to their peer's face as the peer gets sprayed by the "Toilet Trouble" game.

During snack time, the child is sitting with their peers and is eating chips. The child looks towards their instructor who is prompting them to talk to their peers.

During dance party, the child looks at their instructor's face as they dance, hold hands, and face each other.

### **Non-Examples**

During group time, the lead instructor is providing the group with instructions about "Conversation Ball." The child is oriented away from the lead instructor and is looking at the books on the shelf.

During snack, there are multiple children sitting at the table. The child looks at their apple pie as another peer exclaims "I have goldfish for lunch today!"

During art time, the child is painting an elephant. As they conclude their painting, they look at their elephant and say "Look at you, my beautiful elephant."

During game time, the child is playing "Toilet Trouble" with their peers. They look around the rooms as the peer gets sprayed by the "Toilet Trouble" game.

During snack time, the child is sitting with their peers and is eating chips. The child looks at their chips despite their instructor trying to prompt them to talk to their peers.

During dance party, the child dances while looking at the ground.

**On-Task Behavior:** The child is oriented towards their instructor/the lead instructor or instructional materials (e.g., art materials, board games, the "Conversation Ball," etc.), is

positioned in a way that is amendable to learning (e.g., sitting quietly with hands in lap, sitting on the floor while looking at the counting dinosaurs, etc.), is engaged with the materials or instructor/lead instructor (e.g., imitating the dance movements, looking at the lead instructor as they deliver instructions, giving the instructor a high five, etc.), and is responding to questions/directions (e.g., emitting a vocal after being asked how they are doing, raising hand after group instruction to do so, writing on a piece of paper after being told to write their name, etc.) if they are presented.

Adapted from Luke, Vail, & Ayres (2014), Neely, Rispoli, Gerow, & Ninci (2014), and Miramontez & Schwartz (2016)

<b>Examples</b>	<b>Non-Examples</b>
The child is sitting at the table during art time with the necessary supplies to complete the craft in front of them. The lead instructor models the step to complete the project. The child watches the instructor and then completes the step that was modeled.	The child is sitting at the table during art time. The necessary supplies to complete the craft in front of them. The lead instructor models the step to complete the project. The child rolls a marker on the table.
The child is playing “Freeze Dance” during game time. The child dances as the music plays.	During game time, the group is playing “Freeze Dance.” The child looks at books as the music plays.
The child is sitting at social skills group with a paper and marker in front of him. The lead instructor gives the instruction “everyone write your name on your paper.” The child writes his name on his paper.	The child is sitting at social skills group with a paper and marker in front of him. The lead instructor gives the instruction “everyone write your name on your paper.” The child stares out the window.

## **Affect**

**Favorable:** “The child or [instructor] emits a vocalization or assumes a facial expression indicating pleasure, favor, or amusement. This is sometimes characterized by an upturning of the corners of the mouth. Also includes child or [instructor’s] open mouth together with eye brows/furrows high on forehead. The child or [instructor] emits a vocalization such as a laugh, giggle, or high-pitched shriek indicating pleasure, favor, or excitement. The laugh can be 1 second or more. Regardless of content, the tone of voice may be high or low pitched, as long as the voice tone indicates excitement, pleasure, or favor.”

Anderson (2010)

<b>Examples</b>	<b>Non-Examples</b>
The child is sitting at snack with their peers. They smile as a peer tells a joke. A peer and the child are playing “Toilet Trouble.” The peer gets sprayed by the	The child is sitting at snack with their peers. They frown and cry as a peer tells a joke. A peer and the child are playing “Toilet Trouble.” The peer gets sprayed by the game and the child neither smiles nor frowns.

game and the child laughs and says “Better luck next time!”

During game time, the child is playing “What Time is it Mr. Fox?” After hearing that it is “Dinner Time” the child smiles, laughs, and runs back to the start line.

During game time, the child is playing “What Time is it Mr. Fox?” After hearing that is “Dinner Time” the child walks back to the start line with a neutral expression on their face.

The child is dancing during dance party. The “Ice Cream and Cake” song comes on and the child raises their eye brows as they say “Yay! My favorite song!”

Adapted from Anderson (2010)

The child is dancing during dance party. The “Ice Cream and Cake” song comes on and the child begins to cry as they say “This isn’t the song that I wanted!”

**Unfavorable:** “Child or [instructor] engages in vocalizations such as yells, whines with a distress (example include but not limited to pain, fear, etc.) or screams which may or may not be accompanied by physically retreating or protesting or assumes a facial expression [including] grimace (child or [instructor] assumes a facial expression indicating disapproval/dissatisfaction or disgust, characterized by stretching of mouth backwards or forwards [pucker of lips], crunching upward of cheeks and nose), smirk ([instructor] assumes a facial expression indicating un-sureness, self-consciousness, doubting, characterized by an upturning of one side of the mouth, usually accompanied with a sigh, or ‘uh’, or eye roll ([instructor] rolls eyes by raising eye brows and diverting eyes from child, usually following an undesirable event).”

Anderson (2010)

#### Examples

The child throws books in the air as they cry and turn their cheeks downwards as if frowning.

The instructor and child are watching the lead instructor dance and sing during dance party while both frown.

The child asks the instructor for a brown marker. The instructor tells them that they do not have a brown marker and, therefore, the child should ask a peer to borrow their brown marker. The child begins to whine.

Adapted from Anderson (2010)

#### Non-Examples

The child throws books in the air as the laugh and smile.

The instructor and child are watching the lead instructor dance. They both smile and laugh as the lead instructor begins to sing.

The child asks the instructor for a brown marker. The instructor tells them that they do not have a brown marker and, therefore, the child should ask a peer to borrow their brown marker. The child replies “Okay!” with a positive tone while smiling.

**Neutral:** “The child or [instructor] assumes a facial expression or emits vocalizations indicating indifference. The child or [instructor] does not appear to be decidedly happy or particularly unhappy. There are no obvious signs of favorable or unfavorable affect.”

Anderson (2010)

Examples	Non-Examples
During art time, the child is looking at the lead instructor as the instructor explains the art project. The child watches along while neither smiling nor frowning.	During art time, the child is looking at the lead instructor as the instructor explains the art project. The child smiles and seems excited as they watch along.
The child is watching their peers dance along to the music. The child does not show a favorable or unfavorable reaction.	The child is standing on the circle time rug watching the lead instructor dance while crying, frowning, and plugging their ears.
The child dances along during dance party while neither frowning nor smiling.	The child dances along during dance party while smiling and laughing.

Adapted from Anderson (2010)

**Stereotypical Behavior:** Repetitive movements or vocalizations that have no apparent adaptive function.

Adapted from Baumeister & Forehand (1973), Berkson & Davenport (1962), and Kennedy, Meyer, Knowles, and Shukla (2000)

**Whitney:** The child touches the pinky and ring finger together, leaves space between the ring finger and middle finger, and touches the middle finger and pointer finger together while extending the thumb.

**Gracie:**

- The child moves her fingers back and forth while positioning them in front of her eyes.
- The child moves her fingers back and forth on top of an object or body part while looking towards it.

**Tiff:** The child furrows her eyebrows while raising her cheeks until eyes are shut. This may or may not be accompanied with the child opening her mouth to the fullest extent or pushing her clenched hands against her chin.

**Disruptive Behavior:** Any instance of challenging behavior that alters the environment around the child in a negative way or directly harms the child, instructor, or peers. This includes instances of vocal disruption, aggression towards other children, aggression towards instructors, aggression towards objects, eloping from the classroom, or self-injurious behavior.



**Examples**

The child runs up to the instructor and begins hitting the instructor while smiling.

The child runs out of the classroom while screaming, crying, and hitting the walls.

The child grabs paper from the lead instructor's hands and begins tearing it apart while screaming.

**Non-Examples**

The child runs up to the instructor and gives them a high five.

The child is playing catch with a peer. The child cheers for their peer as the peer catches the ball.

The child is working on an art project. The child rips paper to glue onto another.

APPENDIX D

INFORMED CONSENT FORM

## University of North Texas Institutional Review Board

### Informed Consent Form

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

**Title of Study:** Service-learning in action: A description of community based interventions for children with autism

**Investigators:** Dr. Shahla Alai-Rosales & Dr. Jesus Rosales-Ruiz, University of North Texas (UNT)  
Department of Behavior Analysis.

**Purpose of the Study:**

The purpose of this research study is to present information about the *Easter Seals North Texas - Autism Treatment Program* (ESNT-ATP). The program is unique in that the agency has a commitment to non-punitive procedures. Treatment progress and parent satisfaction will be researched and discussed. Parents are asked to give permission for information from their child's participation in the *Easter Seals North Texas - Autism Treatment Program* (ESNT-ATP). Parents will also be asked to give about the program. The information will be confidentially reported for educational purposes. Specifically, we will describe how the interventions were developed, what happened during intervention, how staff was trained, and how satisfied parents were with the results.

**Study Procedures:**

We would like to review and analyze the data that were already collected as part of your child's involvement in the ESNT-ATP program. Your only time commitment for this project is the time it will take to go through the consent process that we are doing right now and to fill out a confidential satisfaction survey. Most parents have taken between 10 to 20 minutes to complete the survey.

There are no foreseeable risks involved with participation in this study. No identifiable descriptions (i.e. names, client account numbers or addresses) will be given in manuscripts or presentations. In the event that vignettes are included, they will involve pseudonyms and composite characteristics and behaviors of several staff/child/parents so that they illustrate a concept rather than describe an individual. In the event actual outcomes are reported, pseudonyms will be used to refer to the person.

**Benefits to the Subjects or Others:**

There are no immediate benefits to you as the participants. Although it is possible that reporting the favorable outcomes of this program could increase the likelihood of sustained funding of the program and increased overall support of programs for traditionally underserved populations. Furthermore, the reporting of this information could provide other programs and universities resources for initiating similar programs designed to train students and contribute to the overall well-being of home communities.

**Compensation for Participants:** None

Office of Research Integrity & Compliance  
University of North Texas  
Last Updated: July 11, 2011

APPROVED BY THE UNT IRB  
5/25/2017 – 5/24/2018

**Procedures for Maintaining Confidentiality of Research Records:** No identifiable data will leave the ESNT-ATP site. ESNT-ATP staff will maintain the confidentiality of the clients and staff will mask all ESNT-ATP records. The investigators will only enter study data by groups and pseudonyms rather than by identifiable individual information (i.e. first and or last name, client account numbers, or addresses). The confidentiality of your participant information will be maintained in any publications or presentations regarding this study.

**Questions about the Study:** If you have any questions about the study, you may contact Shahla Alai-Rosales at 940-565-2274

**Review for the Protection of Participants:** This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-4643 with any questions regarding the rights of research subjects.

**Research Participants' Rights:**

Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Shahla Alai-Rosales, or a designee, has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- *Your decision whether to participate or to withdraw from the study will have no effect on your enrollment at Easter Seals North Texas - Autism Treatment Program.*
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You have been told you will receive a copy of this form.

\_\_\_\_\_  
Printed Name of Participant

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

Office of Research Integrity & Compliance  
University of North Texas  
Last Updated: July 11, 2011

APPROVED BY THE UNT IRB  
5/25/2017 – 5/24/2018

**For the Investigator or Designee:**

I certify that I have reviewed the contents of this form with the subject signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

\_\_\_\_\_  
Signature of Investigator or Designee

\_\_\_\_\_  
Date

## REFERENCES

- Anderson, C.T. *Comparing indices of happiness during teaching interactions*. Denton, Texas. UNT Digital Library. <http://digital.library/unt/edu/ark:/67531/metadc28385/>. Accessed January 31, 2017.
- Bachman, J.E. & Fuqua, R.W. (1983). Management of inappropriate behaviors of trainable mentally impaired students using antecedent exercise. *Journal of Applied Behavior Analysis*, 16(4), 477-484.
- Baumeister, A.A., & Forehand, R. (1973). Stereotyped acts. *International Review of Research in Mental Retardation*, 6, 55-96.
- Berkson, G., & Davenport, R.K. (1962). Stereotyped movements of mental defectives: I. Initial survey. *American Journal of Mental Deficiency*, 66(6), 849-852.
- Celiberti, D.A., Bobo, H.E., Kelly, K.S., Harris, S.L., & Handleman, J.S., (1997). The differential and temporal effects of antecedent exercise on the self-stimulatory behavior of a child with autism. *Research in Developmental Disabilities*, 18(2), 139-150.
- Curtin, C., Anderson, S.E., Must, A., & Bandini, L. (2010). The prevalence of obesity in children with autism: A secondary data analysis using nationally representative data from the National Survey of Children's Health. *BMC Pediatrics*, 10(11). doi: 10.1186/1471-2431-10-11
- Egan, A.M., Dreyer, M.L., Odar, C.C., Beckwith, M., & Garrison, C.B. (2013). Obesity in young children with autism spectrum disorders: Prevalence and associated factors. *Childhood Obesity*, 9(2), 1-7. doi: 10.1089/chi.2012.0028
- Fragala-Pinkham, M.A., Haley, S.M., Rabin, J., & Kharasch, V.S. (2005). A fitness program for children with disabilities. *Physical Therapy*, 85(11), 1182-1200. doi: 10.1093/ptj/85.11.1182
- Kennedy, C.H., Meyer, K.A., Knowles, T., and Shukla, S. (2000). Analyzing the multiple functions of stereotypical behavior for students with autism: Implications for assessment and treatment. *Journal of Applied Behavior Analysis*, 33(4), 559-571.
- Larson, J.L., & Miltenberger, R.G. (1992). The influence of antecedent exercise on problem behaviors in persons with mental retardation: A failure to replicate. *Journal of the Association for Persons with Severe Handicaps*, 17(1), 40-46.
- Luke, S., Vail, C.O., & Ayres, K.M. (2014). Using antecedent physical activity to increase on-task behavior in young-children. *Exceptional Children*, 80(4), 489-503. doi: 10.1177/10014402914527241

- McSweeney, F.K. (2004). Dynamic changes in reinforcer effectiveness: Satiation and habituation have different implications for theory and practice. *The Behavior Analyst*, 27(2), 171-188.
- Miramontez, S.K.H., & Schwartz, I.S. (2016). The effects of physical activity on the on-task behavior of young children with autism spectrum disorders. *International Electronic Journal of Elementary Education*, 9(2), 405-418.
- Morrison, H., Roscoe, E.M., & Atwell, A. (2011). An evaluation of antecedent exercise on behavior maintained by automatic reinforcement using a three-component multiple schedule. *Journal of Applied Behavior Analysis*, 44(3), 523-541. doi: 10.1901/jaba.2011.44-523
- Neely, L., Rispoli, M., Gerow, S., & Ninci, J. (2015). Effects of antecedent exercise on academic engagement and stereotypy during instruction. *Behavior Modification*, 39(1), 98-116. doi: 10.1177/014544552891
- Rokade, P.B. (2011). Release of endomorphin hormone and its effect on our body and moods: A review. *International Conference on Chemical, Biological and Environment Sciences* (pp.436-438).
- Sparrow, S.S., Cicchetti, D.V., & Balla, D.A. (2005). *Vineland adaptive behavior scales, second edition (Vineland™-II)*. Pearson (2005).
- Werling, D.M., and Geschwind, D.H. (2013). Sex differences in autism spectrum disorders. *Current Opinion in Neurology*, 26(2), 146-153.  
<http://doi.org/10.1097/WCO.0b013e32835ee548>